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There is a definite shortage of Turret Lathe Tools to equip machines for vital War Production.

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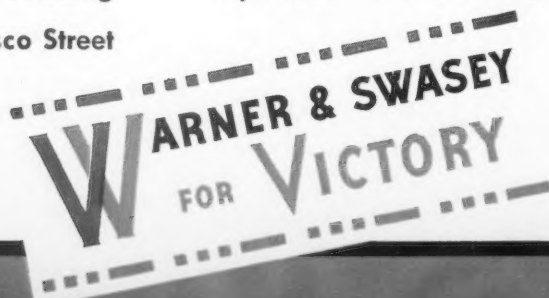
Defense Plant Corporation will authorize the return of surplus materials. Present shortages cover practically all standard tools shown in Warner & Swasey Tool Catalog No. 38. Greatest shortages are on the following items:

**Single Cutter Turners    Multiple Turning Heads (All Types)  
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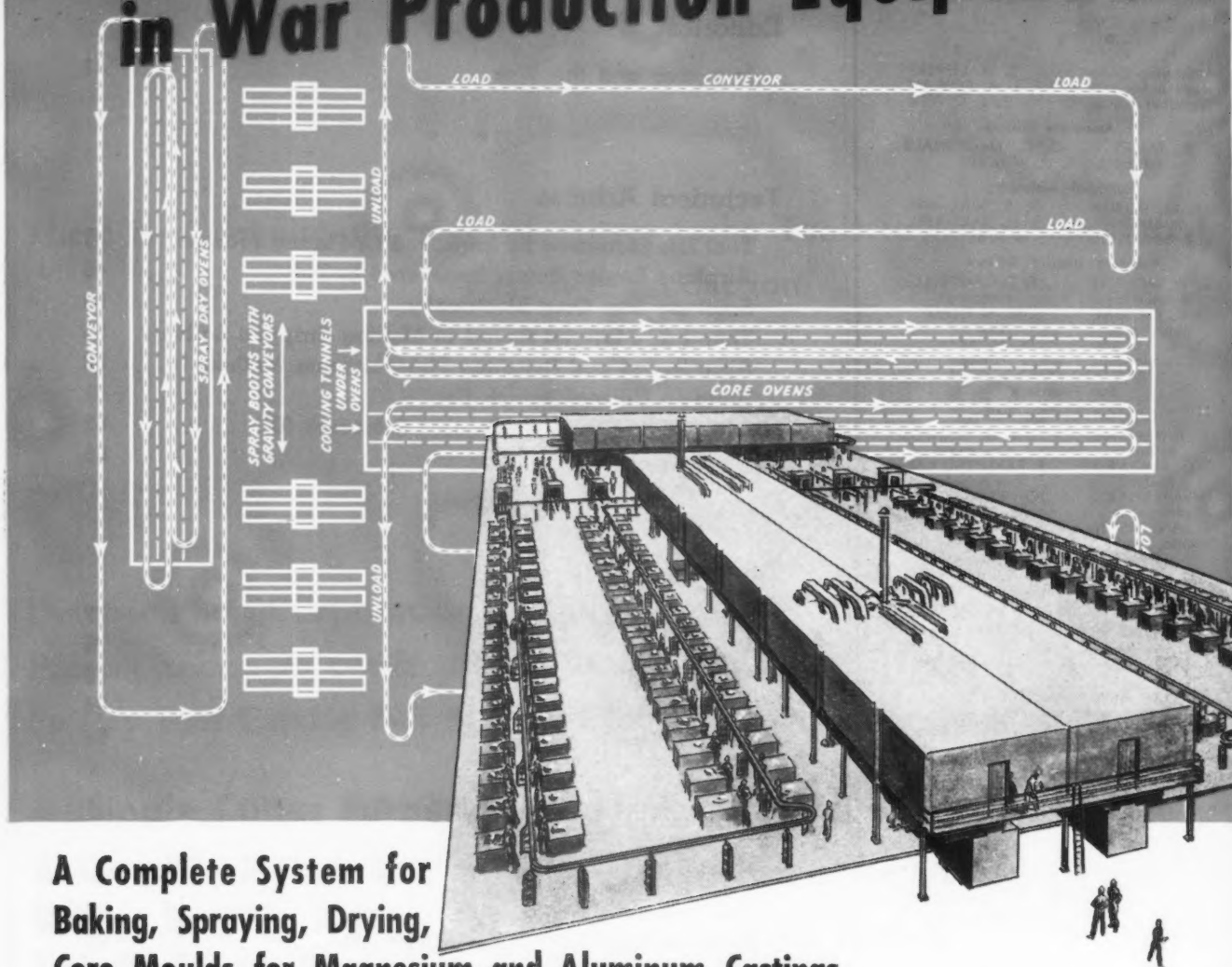
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# THE IRON AGE

° °  
DECEMBER 10, 1942

° °  
ESTABLISHED 1855



## Incentive and the War

HOW America uses or misuses its wide-spread initiative to prosecute the war will determine our success or failure. This undeniable but often overlooked truth was emphasized again and again at the War Congress of American Industry last week.

"Initiative," in the words of J. Howard Pew, president of the Sun Oil Co., who spoke at the Congress on the subject, *Initiative Will Win the War*, "is an intangible thing.

"It is not something that you can give to a man," said Mr. Pew. "It cannot be bought in stores nor can it be acquired from books. Initiative is an attribute of the spirit, springing out of certain urges within mankind.

"Initiative finds its expression in competition, and competition is possible only where there is freedom of choice and action. Where this is denied, initiative dries up and gives way to inertia and inefficiency."

It is recognized that under the exigencies of war production, industry must surrender some of its initiative so that the fullest possible power may be brought to bear to attain certain objectives. Products must be changed from peace to war; certain non-essentials must be curtailed; profits, wages and salaries must expect to bear a hard and unusual burden of taxation in supporting our tremendously increased, non-productive national financial burden. To these ends, general objectives can no longer be dictated by private initiative. But unless and until we make the fullest possible use of private initiative to help meet these necessarily dictated objectives, they will not be met. Instead, they will be choked to death by the weeds of inefficiency sprouting from a regimenting bureaucracy which limits attainment to its own mediocracy.

In business, if you want something accomplished, you find a good man. Preferably one who knows more about his specialty than do you. You point out to him the general objectives that you seek to have him attain. You give him the responsibility and the requisite authority and tell him to go to it. And if he is the good man that you thought he was, he goes to it and brings home the bacon.

You do not attempt to make an automaton of him by doing his thinking for him.

If government had set out to apply this sound business principle of defining objectives and making industry responsible for meeting them, giving industry the requisite authority to do so, we would not have an administrative army of strap-hangers nearly rivaling in size that of our armed forces.

The bigger Washington grows, the less room will there be for the exercise of this precious ingredient of success, initiative, in the rest of our great country.

*J. H. Lawrence*





*A new production record brings smiles to Inland's veterans of two wars.*

## *Steel Veterans of Two Wars Set New Records*

Three veteran employees and the oldest mill at Inland's Indiana Harbor plant broke records in 1917, and now are making new high marks for the company's war production record book.

This 24" structural, bar and universal plate mill was constructed in 1901. One of the veteran rollers, Dan Philp, started to work for Inland in 1909; Joe Carner added his skill in 1910; and, Dan Fabian started on the 24" mill in 1912. Recently these steel veterans of two wars stepped up to a new all-time high—their production of angles and plates for Liberty ships, and plates for Army truck parts.

The spirit of these veterans is typical of all Inland men. Every Inland furnace and every Inland mill is producing more steel than it has ever made in the past. Records on individual mills often stand only a few days before a new high mark is set. Maintenance men are doing their work faster—engineers are crowding new construction to the utmost—and every Inland ore freighter has broken its former record.

Yes, Inland mills and men are doing everything possible to give America steel for more ships, tanks, guns, shells—and all else needed to win the war.

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to Victory*

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# Tool Life Increased

## by Improved Chromium Plating Process

**... By chromium plating high speed steel tools and subsequently relieving inherent hydrogen embrittlement through the use of a special oil treatment, greater life and higher production rates can be achieved with such tools. Drills, reamers, taps and form tools have been successfully plated, as well as lathe tools.**

IN spite of the fact that chromium plating of small tools has been tried many times and has never proved entirely successful, a method recently developed in the engineering department of the Crowell-Collier Publishing Co., Springfield, Ohio, has gone far in overcoming the arguments against such a process of tool conservation. Months ago, when it became difficult for this company to procure high speed tools and cutters, Axel E. Lundbye, chief engineer of the plant, began casting about for methods of increasing tool life and conserving what little stocks of high speed steel tools there were on hand.

After much experimenting, it was discovered that chromium plating the cutting edges of the tool best increased tool hardenability and tool life, but there was considerable embrittling of the tool because of the hydrogen picked up on the tool face in the plating bath. Various methods of relieving this hydrogen embrittlement were tried but none were quite as successful as the use of a heated oil bath. This oil bath presumably releases the hydrogen which has been absorbed along with the chromium, and by so doing decreases the brittleness of the base material.

The plating process used is of a garden variety type, involving no special techniques or complicated plating baths. The tool to be plated is first ground and then honed with a fine stone to give a finer and smoother finish to the cutting area and to clean the steel in preparation for the plating application. The cutting edge of the

tool is then dipped into a 10 per cent hydrochloric acid bath for 30 sec. and well rinsed in cold water. This thoroughly cleans the cutting edge of the tool.

### Use Chromium Salts Only

The plating bath is made up of 50 oz. of 99.75 per cent chromium trioxide, dissolved in water, to which 0.5 oz. of concentrated sulphuric acid is added. The solution is then made up to 128 oz. or 1 gal. The same proportions hold true for any quantity of solution. Allowance must be made for the sulphate content of the chromium trioxide in adding sulphuric acid in the bath. The temperature of the bath during operation is held between 110 and 150 deg. F., and current densities range from 130 to 200 amp. per sq. ft., depending upon the material to be plated and the type of plating required.

When the chromium plating bath is ready for use, the tool is used as the cathode and is placed in the solution to a depth of  $\frac{1}{4}$  in. above the cutting edge. The anode is preferably lead, although stainless steel can be used, and its size is governed by the article to be plated. In the first step, the current is reversed for a short time from 200 to 400 amp. per sq. ft., again depending upon the material to be plated, making the tool the

anode. At the end of this period, the current is again reversed so that the tool once more becomes the cathode, at 130 to 200 amp. per sq. ft. When this has been done, giving the tool a flash plating, the current is decreased immediately to 120 to 180 amp. per sq. ft., and plating proceeds for a definite period of time. The time limit is quite variable, ranging from 1 to 4 min. for each square inch of steel surface exposed to the plating bath, at a definite current density. This can best be determined by experiment.

### Oil Treatment

After plating, the tool is removed, rinsed well in cold water, and dried immediately. The chromium deposit should be semi-lustrous blue-white, and distributed evenly over the tool. It is important that a bead does not form on the cutting edge of the tool. Should this happen, the tool must be stripped of the deposit and replated.

After plating, rinsing, and drying, the tool is transferred to an oil bath which is heated to a temperature of about 350 deg. F., where it remains for one hour. Then it is removed and allowed to cool to room temperature. This oil bath, it is believed, releases the hydrogen in the deposit, and eliminates hydrogen embrittlement in

By THOMAS E. LLOYD

Cleveland Editor, THE IRON AGE

the tool. After the tool has been oil-treated and cooled, the oil is removed and the tool is ready for use.

It has been found that to avoid a bead being formed on the cutting edge of a tool that is plated more heavily than the standard thickness of less than 0.0001 in., it is necessary to raise the temperature of the plating bath to 150 deg. F. This slows down the rate of deposit and makes the deposit smoother, permitting the chromium deposit to be built up to many more times the designated thickness.

#### Offered License Free

This process has proved highly satisfactory for use on practically every type of metal cutting tool, regularly increasing the tool life anywhere from 100 to 400 per cent, and permitting faster operation of the tools. While patents have been applied for, the process has been released by the company for the war's duration for use on government work, without royalties or other charges. An offer has been made to plate a sample tool for any company on war work, and if the results are satisfactory, the company will be given the specifications for the system and the engineers of Crowell-Collier Publishing Co. will then act as technical advisers, training personnel to handle the process and helping in the set-up of the equipment.

The Springfield plant of Crowell-Collier has in reality developed into a school to save high-speed steel.

Companies using the process have been sending men to Springfield for periods of three days to learn how to operate the system. To date, more than 600 companies have been licensed to use the process, and close to 100 companies have already installed plating systems under the supervision of the engineers of Crowell-Collier Publishing Co.

#### All Kinds of Tools Plated

Some of the tools and parts which have given highly satisfactory service after plating by the Lundbye process are: Drills, taps, reamers, forming tools, files, end mills, face mills, straddle mills, broaches, cut-out saws, punches and dies, thread gages, gear cutters, tool bits, gage blocks, piston rings, valve inserts and exhaust valves for internal combustion engines, interiors of machine gun barrels, dental burrs, and a great variety of other tools and parts subject to wear, abrasion and corrosion. One recent job that was a bit unusual but indicative of the diversity of application of this process, was for A. J. Higgins, at New Orleans. The Monel metal in some pumps had to be replaced, because of its scarcity, with tobin bronze, into which the pump packing cut quite severely. The bronze was plated by the Lundbye process, and now gives considerably better service than did the monel.

#### Tests on Gear Shaper Cutters

Some results of tests made by a large machine tool company in the

Middlewest indicated a very great increase in tool life for molybdenum high speed steel external grinding centers and molybdenum high speed steel cutters used on Fellows gear shapers. In the test, two new gear cutters were used, one being chromium plated to a depth of 0.0001 in. and the other cutter remaining unplated. Cutters were identical, having specifications as follows: Diametral pitch, 8-10, pressure angle, 20 deg.; number of teeth, 32; tooth depth, 0.225 in.; base diameter, 3.7551 in.; type, finishing cutter; cutter material, 8 per cent molybdenum steel. All steel used in the test was NE 8447, with a Brinell hardness between 196 and 200.

The chromium plated gear cutter was mounted on a Fellows 6-A type gear shaper and the machine speed was set at 184 strokes per min., with 1080 strokes per revolution of the cutter, and held constant throughout the test. The gear made two revolutions to remove 0.040 to 0.045 in. of stock over pins. This cutter finished 15 gears of 48 teeth each, with a tooth width of 1 1/4 in. The teeth on the first few gears appeared slightly rough, but became smoother as more gears were finished. All gears showed up satisfactorily on a Red Liner chart.

The unplated cutter was then placed on the same shaper and completed the same test.

Then, the plated cutter was remounted in the gear shaper to

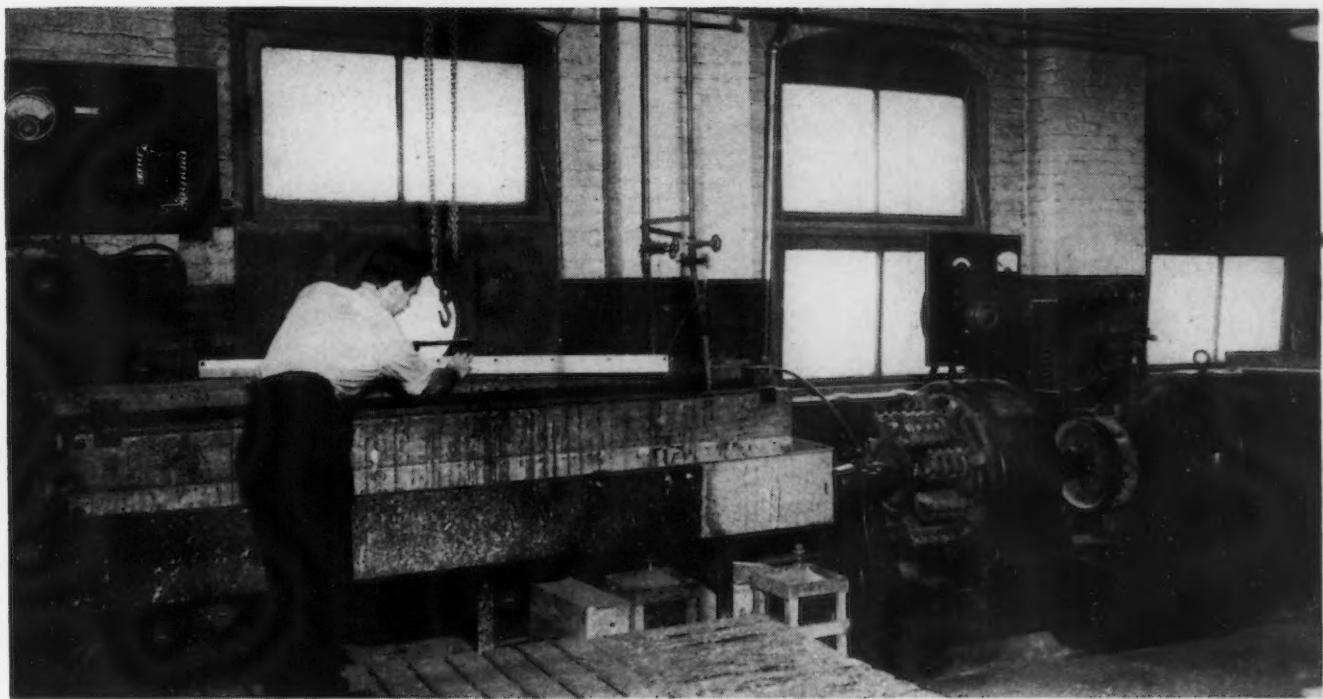
TABLE I  
Metal Ground Off in Sharpening Gear Shaper Cutters

Cutter	Cutter Width Before Grind, In.	Cutter Width After Grind, In.	Metal Removed By Grind, In.	Number of Teeth Equivalent to 1 1/4-In. Tooth Width	Teeth per 0.001-In. Grind	Performance Ratio
Unplated	0.8555	0.7605	0.095	1760	18.53	1
Plated	0.9035	0.8940	0.0095	5056	532.22	28 to 1

TABLE II  
Performance of Plated and Unplated Gear Shaper Cutters

Cutter No.	Condition	Material Cut	Number of Teeth Cut, Equivalent to 1 1/4-In. Wide	Performance Ratio	Tool After Experiment
1	Plated	NE 8447	5056	2.88	Red liner bad, tool not peeled but needed re-grinding
2	Unplated	NE 8447	1760	1	Peeled
2	Plated	NE 8447	5740	2.67	Red liner good, tool could continue cutting
1	Unplated	NE 8447	2150	1	Peeled





**N**ORMAL chromium plating equipment can be used in the plating of high speed steel tools and parts by the Lundbye process. Operators are trained in three days by Crowell-Collier engineers to handle plating and treatment of these tools.

o o o

finish 15 gears of 52 teeth each with a  $1\frac{1}{4}$  in. tooth width. The teeth were smooth and the gears checked well within the allowed limits on the Red Liner. The cutter was removed and found to be in good condition with the plating still intact. This cutter, by this time, had cut 1500 teeth.

The unplated cutter was then remounted in the gear shaper and was started cutting the same type gear as was completed by the plated cutter. The twentieth gear finished, or the fifth gear in the second run, showed greater errors than allowable when checked against the master gear on the Red Liner. The cutter was then removed and on examination showed that one tooth had peeled back. The tool had cut a total of 1760,  $1\frac{1}{4}$ -in. teeth before failure.

The plated cutter was again mounted on the shaper and was used to cut 22 gears of 70 teeth each. Upon examination after this run, it was discovered that the plating had chipped or worn off the cutting edge of the tool, but the cutter was still sharp enough to use further, as the metal of the cutter had not peeled. All gears cut were within the limits allowed. The plated tool had, at this point, cut a total of 3040 teeth of  $1\frac{1}{4}$  in. width and was not too dull to cut more.

The cutter was again mounted, and 18 gears of 80 teeth each, with a tooth width of  $1\frac{3}{4}$  in. were cut.

The  $1\frac{3}{4}$  in. width of face on this gear was equivalent to 112 teeth of the  $1\frac{1}{4}$  in. width. The gears were to be finished with two cuts of the finishing cutter at a shaper speed of 184 strokes per min., with 1280 strokes per revolution of the cutter. The gears checked satisfactorily on the Red Liner. Some of the teeth appeared to be rough, but were good enough to pass inspection. The cutter, upon removal, was found to be slightly dull.

Tabulating the results of the test, the plated cutter had cut the equivalent of 5056 teeth with a tooth width of  $1\frac{1}{4}$  in., while the unplated cutter had cut only 1760 teeth of the same tooth width. Both tools were sent to the grinding room for grinding. The amount of metal ground off is shown in Table I.

#### Plated Cutters Reversed

Later, the unplated cutter was plated and the plated cutter was stripped of its plating, and another series of tests were made. These cutters were used to finish cut 50 gears with 80  $1\frac{1}{4}$ -in. teeth, and 50 gears with 69  $1\frac{1}{2}$ -in. teeth. Steel used in these tests was NE-8447, having a Brinell hard-

ness of 202 to 215. The same machine was used as in the previous test and the speeds employed were 184 cutter strokes per min. with 1080 strokes per revolution of the cutter. Standard feeds for this machine call for 1260 strokes per sec. The machine was running 14.3 per cent more feed than the standard feeds specified. The gears made two revolutions to remove 0.050 to 0.080 in. of stock, over pins.

The plated cutter, which in the first test was the unplated cutter, was mounted. It finished cutting 50 of the 80-tooth gears and 21 of the 69-tooth gears, without the Red Liner showing any rough teeth. The plated cutter at this point had cut 4000  $1\frac{1}{4}$ -in. teeth, and 1449  $1\frac{1}{2}$ -in. teeth. This was equal to 5740 teeth of the  $1\frac{1}{4}$ -in. tooth face width. At this point the plated cutter was removed and found to be slightly dull.

The unplated cutter, the one from which the plating had been stripped, was mounted on the machine and used until the Red Liner chart showed teeth to be rough. The job was to finish the remaining 69-tooth gears of which there were 29. For the first 23, the Red Liner gave a smooth line, but the 24th gear gave a rough red line. However, the gear passed inspection. The chart on the 26th gear was very rough and beyond the limits of allowable error. The unplated cutter had cut 1794 teeth of  $1\frac{1}{2}$  in. width, equivalent to 2150 teeth

of 1¼ in. width. Upon examining this cutter, it was found that one tooth had peeled back slightly. Both tools were sent to the grinding room for sharpening. The relative performance of the two-gear cutters, both plated and unplated, is correlated in Table II.

A large Canadian manufacturer reported a complete run on a reamer and on a hob. The reamer was cutting an alloy steel of the following analysis: Nickel, 3.00 per cent; chromium, 1.00 per cent; and carbon, 0.35 per cent. The original production ran between 30 and 35 pieces per grind, but after plating, 646 pieces, or an increase of over 2000 per cent, were completed before grinding was necessary. The hob was used in cutting a gear of SAE 4620 steel. The unplated hob cut 18 pieces, while the plated hob finished 35 pieces, an increase of about 91 per cent in tool life.

A manufacturer of steel wool submitted 12 steel shaving tools to a rigid test. The 12 plated shaving tools ran an average of 8 hr., 36 min., before regrinding was necessary, while the check tools used in the run stood up for an average of

2 hr., and 35 min., before regrinding was necessary. The steel wool was reported to have flown off the plated tools more smoothly than off the unplated tools and the plated tools could be used on very thin wire where such use could not be made of unplated tools of the same number of serrations.

#### Armor Plate Drills

A manufacturer who converted his plant from peace-time production to fabricating cast steel armor plate had similar success with the chromium plated tools. Several drills used in drilling this cast armor steel were carefully checked against drills that had been in use. One of the plated drills produced 125 holes in cast armor plate, and the drill did not yet require sharpening.

A screw machine products company reports 12,000 pieces finished with a plated combination straight and angular reamer, as against 4500 pieces with an untreated reamer.

A plated form shaving tool used by another manufacturer produced

about 30,000 pieces against 3000 to 4000 pieces produced by unplated tools.

A large foundry in the East had several types of tools plated. One was a 3 31/32-in. high speed steel gun boring cutter. The plated cutter operated 163 hr. at a surface speed of 32 ft. per min., and a feed of 0.012 in. The same cutter, unplated, operated at the same cutting speed and feed, averaged only 60 hr. service before it became too short for further use.

A vertical boring mill cutting tool, made of Rex AA high-speed steel, was used in boring armor plate. The tools were operated at a speed of 28 ft. per min., with a 3/32-in. feed and a ½-in. depth of cut. The plated tool completely rough machined the bottom rings on two M-4 tank turrets, a total of 40 hr. continual service. The standard tool, with no plating, had to be ground twice to complete one turret.

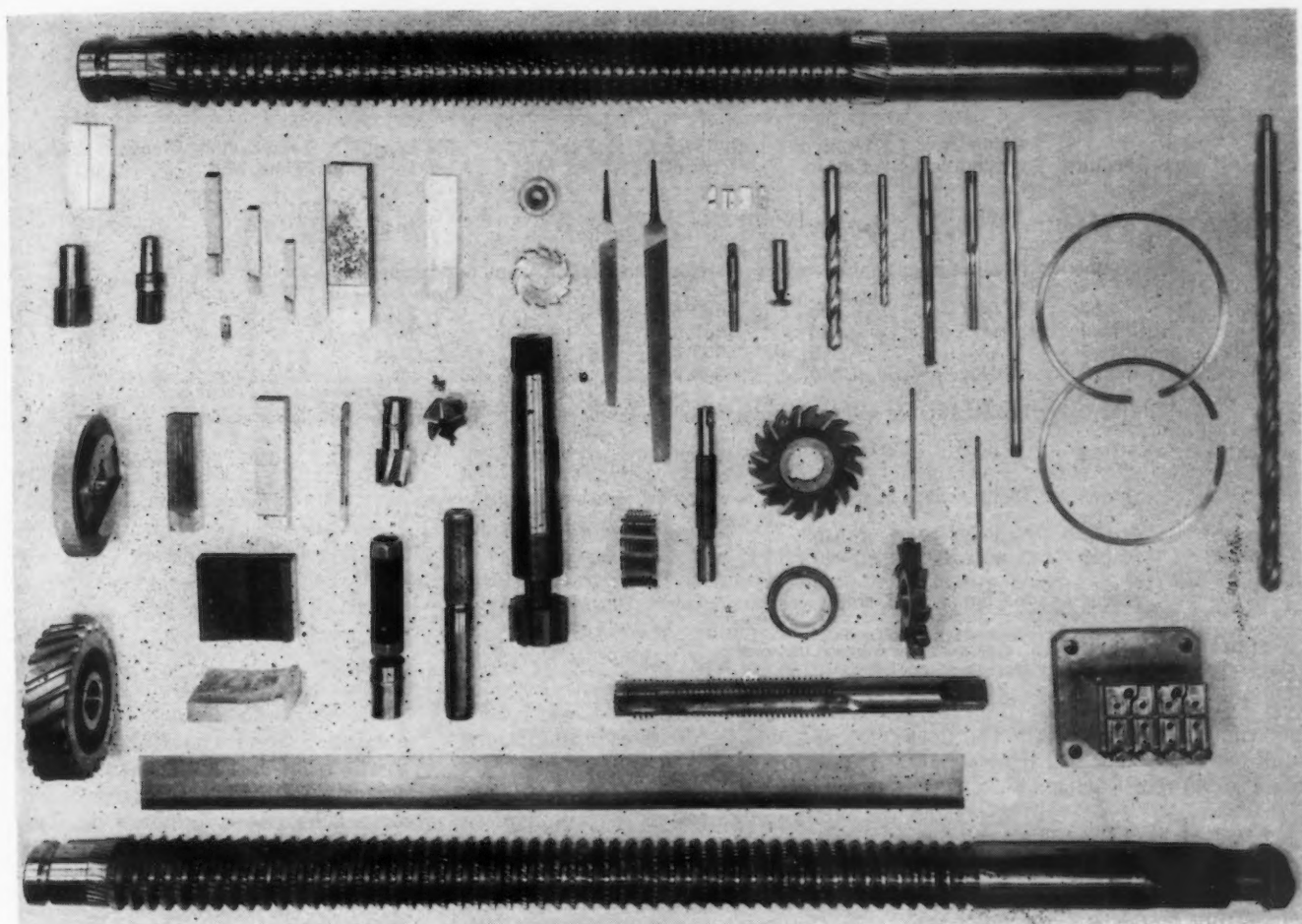
A midwest manufacturer of electrical products had equally favorable results. An end mill cutter, used to mill off bosses on a cast iron supporting frame piece, was

TABLE III  
Tests on Lathe Tools Used in 20 mm. Shell Production

Tool No.	Condition	Operations Completed Before			Total No. Operations	Average Number Operations Completed Per Grind
		1st Grind	2nd Grind	3rd Grind		
1	Plated	1290			1290	1290
	Unplated	792	692		1484	742
2	Plated	6633			6633	6633
	Unplated	1520	1360	1640	4520	1507
3	Plated	2838			2838	2838
	Unplated	1680	1860	1250	4790	1597
4	Plated	2838			2838	2838
	Unplated	1805	1380	1540	4725	1575

TABLE IV  
Tests on Lathe Tools Used on 155 mm. Shell Production

Tool	Condition	Operations Completed Before							Total	Average Number of Operations per Tool Grind
		1st Grind	2nd Grind	3rd Grind	4th Grind	5th Grind	6th Grind	7th Grind		
Bit	Plated	79	171	150					400	133
	Unplated	30	16	20	23	55	15	40	199	28
Bit	Plated	318	215						533	266
	Unplated	46	28	55	88				217	54
Bit	Plated	782	998	837					2716	872
	Unplated	87	111	93					291	97



plated. This cutter machined 1100 pieces satisfactorily, while standard high speed end mills used previously machined only around 250 to 300 frames between grinds.

#### Shell Forming

Investigations by a large motor car manufacturer now in production on a variety of war products were also made. Tests were run on

THESE are just a few of the tools that have been treated by this process and are giving better service. Broaches, files, end mills, taps, reamers, milling cutters, piston rings, forming cutters, plastic and injection molds are among the tools and parts shown here.

o o o

155 and 20-mm. shells in actual production, and investigators reported that "the Crowell-Collier

Publishing Co. has made a definite contribution in prolonging the life of cutting tools."

In a production run on 20-mm. shells, the results shown in Table III were achieved, while in a production run on 155-mm. shells, results shown in Table IV indicate the advantages of the plated tools.

Another shell maker reports increases of tool life of about 400

TABLE V  
Laboratory Test No. 1 on Cutting Tool Bits

Tool	Condition	Diameter of Round Stock, In.	Depth of Cut, In.	Cutting Speed, Ft. Per Min.	Feed, In. Per Min.	Length of Cut, In.	Remarks
Tool "A"***	Unplated	55/16	5/16	58.5	1/4	4	Tool dulled after 4-in. of cutting length
Molite	Plated	55/16	5/16	58.5	1/4	4	Tool remained intact
Molite*	Plated	55/16	5/16	58.5	1/4	25/8	Tool remained intact
Molite*	Plated	5	5/16	99.0	7/16	10 1/8	Tool remained intact
Molite***	Plated	41 1/16	1/2	93.5	7/16	9 7/8	Tool remained intact
Molite	Plated	43/16	5/8	82.5	7/16	9 1/2	Tool remained intact
Molite	Plated	39/16	3/4	68.5	7/16	9 1/8	Tool remained intact
Molite	Plated	213/16	3/32	142.5	17/32	7 1/8	Tool remained intact
Tool "A" (new bit)	Unplated	223/32	7/64	134.5	17/32	8 5/8	Tool chipped and was set aside

\* Steel round not heated

\*\* Tool chipped on 1/2-in. feed, resharpened on top only and test made

\*\*\* Steel round heated at this point



TABLE VI  
Laboratory Test No. 2 on Cutting Tool Bits

Tool	Condition	Diameter of Round, In.	Depth of Cut, In.	Cut Speed, Ft. per Min.	Feed, In. per Min.	Cut Length, In.	Total Cutting Time, Min.	Reduced Diameter, In.
Tool "A"	Unplated	4 <sup>61</sup> / <sub>64</sub>	0.046	157.5	1 <sup>33</sup> / <sub>64</sub>	6 <sup>1</sup> / <sub>32</sub>	5.86	4 <sup>54</sup> / <sub>64</sub>
Remarks: Machine stopped after making above cut and tool was found to be chipped								
Molite	Plated	4 <sup>61</sup> / <sub>64</sub>	0.046	157.5	1 <sup>33</sup> / <sub>64</sub>	2 <sup>1</sup> / <sub>2</sub>	2.65	4 <sup>54</sup> / <sub>64</sub>
Molite	Plated	4 <sup>61</sup> / <sub>64</sub>	0.046	157.5	1 <sup>33</sup> / <sub>64</sub>	2 <sup>3</sup> / <sub>8</sub>	2.23	4 <sup>54</sup> / <sub>64</sub>
Molite	Plated	4 <sup>54</sup> / <sub>64</sub>	0.046	156.0	1 <sup>33</sup> / <sub>64</sub>	13 <sup>5</sup> / <sub>32</sub>	8.62	4 <sup>48</sup> / <sub>64</sub>
Molite	Plated	4 <sup>48</sup> / <sub>64</sub>	0.046	246.0	2 <sup>23</sup> / <sub>64</sub>	9 <sup>1</sup> / <sub>16</sub>	0.37	4 <sup>43</sup> / <sub>64</sub>
Remarks: Machine stalled and tool was found to be slightly chipped. Test continued at slower speed								
Molite	Plated	4 <sup>43</sup> / <sub>64</sub>	0.046	154.0	1 <sup>33</sup> / <sub>64</sub>	12 <sup>21</sup> / <sub>32</sub>	8.27	4 <sup>43</sup> / <sub>64</sub>
Remarks: Tool remained in about the same condition, showing just slight wear.								
Molite*	Plated	4 <sup>43</sup> / <sub>64</sub>	0.046	150.0	1 <sup>33</sup> / <sub>64</sub>	12 <sup>21</sup> / <sub>32</sub>	8.63	4 <sup>37</sup> / <sub>64</sub>
Molite**	Plated	4 <sup>37</sup> / <sub>64</sub>	0.046	234.0	2 <sup>23</sup> / <sub>64</sub>	3 <sup>3</sup> / <sub>32</sub>	0.08	4 <sup>31</sup> / <sub>64</sub>
Remarks: Machine stalled, cutting tool showed point chipped off.								

\* Test began the following day on the steel at room temperature  
\*\* Steel heated to about 125 deg. F., again, and cutting speed was increased

per cent on firm tools for the nose and boat tail and for the copper band on 40 mm. shells.

#### Laboratory Tests

Pittsburgh Testing Laboratory, which does considerable research and testing of new materials and processes, ran experiments on three commercial tool bits, which were identified in its report as Tool "A," the unplated tools, and Molite No. 5 (9 per cent molybdenum), the plated tools. The tests were made on both types of bits under as nearly similar conditions as was possible. No coolant was used in the tests so that the time of the

test could be held at a minimum. Furthermore, cutting speed was progressively increased until the cutting edge failed.

Two tests were made with each type of tool bit. The unplated commercial tool bit "A" that was used in the first test chipped at the start of the cut. This tool was sharpened and used. In the second test the unplated commercial tool bit "A" also chipped at the end of one length of cut. This bit was set aside and a new one used in the second test. Before certain cuts were made, the steel round was heated to about 125 deg. F., to keep the temperature of the steel about the same for both tool bits while

cutting. Steel rounds were used in the tests, but each test employed a steel of a different hardness. The Brinell hardness numbers on these steels were:

Diameter, In.	Location	Brinell Hardness Number
TEST NO. 1		
5 <sup>5</sup> / <sub>16</sub>	rolled edge	229
2 <sup>5</sup> / <sub>8</sub>	turned end	241
TEST NO. 2		
5 turned to 4 <sup>1</sup> / <sub>2</sub>	turned end	156

TABLE VII  
Performance Data on Forming Tools

Tool No.	Type of Tool	Brand	Condition	No. of Cuts
1	Grooving form tool	.....	Plated Unplated Plated and reground without removing plating	1020 675 1065
2	Grooving form tool	Trojan	Plated Unplated Plated and reground without removing plating	1220 400 985
3	Rib form tool	Rex AA	Plated Unplated Plated and reground without removing plating	925 230 400
4	Rib form tool	Trojan	Plated Unplated Plated and reground without removing plating	312 77 221
5	Grooving form tool	Spartan	Plated Unplated Plated and reground without removing plating	312 77 221

**TABLE VIII**  
**Performance of Plated and Unplated 1/2-In. Twist Drills**

Condition	Number of Cuts Made After				Total No. Cuts
	Plated as Received	1st Grind	2nd Grind	3rd Grind	
Plated*	163	156	166	159	644
Unplated	48	120	37	42	247

\* The plated drills were found to hold holes to production tolerances of 0.500-in., plus 0.005-in., thus eliminating the regular subsequent operation of reaming to exact size. Reaming is necessary when high speed steel drills are used.

The tests run by the Pittsburgh Testing Laboratory indicated that plating not only greatly increased the life of the cutting tool, but also permitted faster machining operations and heavier feeds. The actual results of the tests are shown in Tables V and VI.

The tests made by various manufacturers, along with those made by the Pittsburgh Testing Laboratory, indicate without doubt that the Lundbye chromium plating process for high-speed steel tools increases tool life. The chromium plate increases the hardness of the tool bearing surfaces, the inherent "oiliness" of chrome prevents galling and building up of cuttings or drillings, and the low coefficient of

friction of chromium reduces heating of the tool, with its consequent annealing effect on the tool while in operation. All of these characteristics aid in increasing both tool life and the speed of production. It has been found that even though the plating has been worn through in a tool, the remaining life of the tool is often higher than a tool that was not plated. This is probably accounted for by the plating process having a chromizing action as well as a plating action on the tool. Furthermore, the plating of plain carbon steel tools has in some instances permitted their substitution for high-speed tools.

One large steel plant in Canada stated that "it is most apparent

that the chromium surface materially reduces the chip friction and although we have not made such tests, we are prepared to say that the spindle torque is also reduced. We fully expect to find that these tools are cutting with less horsepower than the standard high speed tools. This is indicated by the different nature of chips and improved finish of the cut." This steel plant made exhaustive examinations of the performance of these tools by running plated tools against standard tools on machines of exactly similar type in the same production lines. The data shown in Tables VII and VIII were accumulated by this company.

## *Airplane Engine Power Recovered on Test*

**I**N connection with airplane engine testing at the Melrose Park, Ill., plant of Buick Motor Co., a system of power recovery is used whereby a large portion of the fuel energy is recovered as electrical energy and pumped directly into the plant power lines. A 1000-kva. synchronous alternator is connected to the engine under test by means of a unique magnetic coupling.

The alternator first is used as a synchronous motor to start the engine, then is shut down. The magnetic coupling rotor attached to the alternator is then held stationary by an air-operated brake. In this position the magnetic coupling is used as an absorption or eddy current dynamometer. By exciting the field of the coupling, the engine is loaded to any desired value, at all test speeds, up to and including the synchronous speed of the alterna-

tor. During this relatively short part of the test, all power is absorbed by the magnetic coupling and dissipated in heat by means of water cooling.

After completing this portion of the test, the air brake is released and the alternator again connected to the power line. At all engine propeller shaft speeds above the synchronous speed of the alternator, the magnetic coupling acts as a slip coupling to transmit the engine power to the alternator, which runs at constant speed. In this way the alternator and magnetic coupling deliver generated energy to the power lines and absorb a lesser amount of energy, created by the slip speed difference between the engine propeller shaft and the synchronous speed of the alternator.

With a conventional type electric clutch, the torque at the output shaft increases with the slip till a

point is reached beyond which increased slip causes a rapid decrease of output torque. With the magnetic coupling used here, increased slip also causes increased torque, but no point is reached at which torque decreases with increased slip. As a result, the efficiency is remarkably high. This characteristic also contributes much to stable speed control.

This difference in torque characteristic is obtained through the use of an electronic d.c. supply for the excitation of the magnetic coupling. This enables engine speed to be maintained at a constant value for any setting of a speed control potentiometer, and for any throttle opening. The engine will hold its predetermined speed and deliver any power to the coupling, up to the capacity of the engine at the speed held, depending upon the throttle setting chosen.

# Smelting Iron Ores

**B**ASED upon previous experience with iron furnaces and also upon experience gained from furnaces designed for the reduction of nickel oxides at Kristiansand, Norway, and at a plant in Canada, Ivar Hole believed that for smelting pig iron the furnace profile must be altered and the electrodes protected against pressure from the charge, since the charge in this case had a higher electrical conductivity. Mr. Hole also solved the problem of the correct position of the electrode in the charge.

His designs were eminently successful, and it is now possible to use any kind of reducing agent from the soft charcoal or charred materials to hard coke or anthracite as well as any combinations of those. Hole also provided the furnace with a gas cleaning plant in order to utilize the furnace gas for heating purposes.

Fig. 4 shows a schematic view of the furnace as it appeared in 1928, and in Fig. 5 is shown a front view of one of the six units of a type

of Spigerverk furnace that is in operation in a plant in Southern Europe.

The gas is drawn out at the furnace end and passes through a cleaning plant located behind the furnace.

The furnace is charged through shafts, as shown in Fig. 4, either from silos above or from nearby bins by means of monorails or conveyors. Corrections of the charge are made through the shafts or when an immediate correction is desired through holes in the arch.

Because of the low gas velocity in the furnace, a comparable large amount of fine material may be smelted without excessive dust loss. The temperature of the outgoing gas is low, averaging only 250 deg. C. (480 deg. F.) or less, and the gas pressure is also very low. Because of the low temperature under the arch, arch maintenance is negligible. The gas is sucked out of the furnace and the pressure automatically regulated so that only a very small amount escapes through the

shafts. In Fig. 6 can be seen this small amount of escaping gas burning along the rim of the charging trough. This is desired as an indicator for the right operation of the gas suction regulator. The arch is provided with a number of holes covered by fire clay or cast iron plates, and the furnace is thus made absolutely safe for excessive pressure.

The furnace operates on three-phase current and is equipped with three electrodes each served by single-phased transformers. The power factor is somewhere between 0.85 and 0.95, usually 0.90 or above. The furnace voltage which may go as high as 190 volts is adjustable under load either by button control or automatically. Ordinarily, however, the furnace load is adjusted mainly by raising and lowering of the electrodes, which is mechanically and automatically regulated.

## Tapping

The pig iron and slag are tapped through a common tapping hole and are separated outside the furnace by means of a syphon arrangement. The pig iron is tapped into ladles or molds, or possibly into a casting machine, while the slag is usually granulated.

The furnace gas is cleaned by a cyclone, scrubber or electrical precipitation. As a rule the gas suction from the furnace is automatically adjusted. Shutdowns are rarely necessary as cleaning of the gas channels and tapping are all carried out under load. "Slipping" of the Söderberg Electrodes is always done under full power load. As the heat is concentrated in the center of the furnace crucible, away from the walls, and the intense heat zone is surrounded only by the ore charge and molten material (slag and iron), the heat losses are very small compared with that in the standard blast furnace. These facts are mainly responsible for the unusual flexibility in operation.

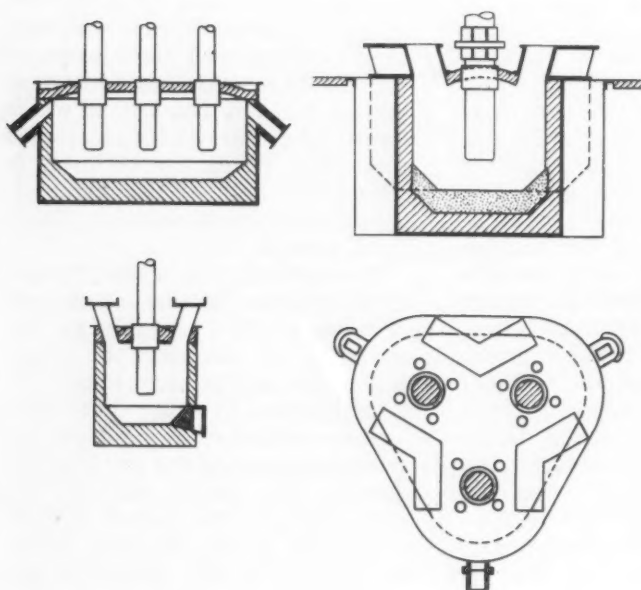


FIG. 4—Schematic view of the Tysland-Hole furnace.



# Electrically

By HERMAN COWES  
*Metallurgist, Det norske Aktieselskab for  
Elektrokemisk Industri*

The Tysland-Hole furnace, therefore, can be operated at varying loads, and as low as 50 per cent of maximum load, without disturbances or variation of the iron analyses, power and electrode consumption. This flexibility makes it possible to operate with peak loads, and to use surplus power when available. The furnaces should, therefore, be considered as a desired power consumer.

Because of the low charge height and low gas amount, there are no particular requirements as to physical strength of the raw materials, as there is in the blast furnace charge, where the weight of the burden makes necessary the use of strong materials to keep the charge open and permit passage of the gases.

The materials used are lump ores, sinter or briquettes, to which limestone is added for formation of the slag. The carbon used for

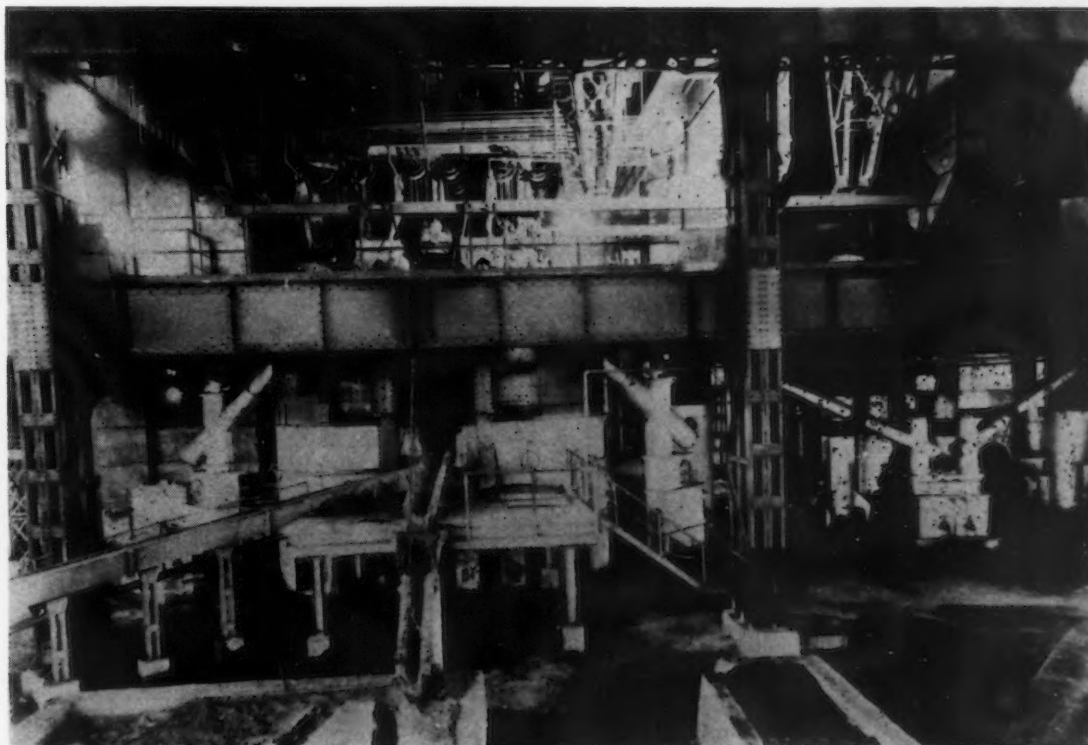
**... In this, the conclusion of a two-part article, the author brings his survey of electric smelting up-to-date with a discussion of the Tysland-Hole furnace, its construction, operation and competitive position with respect to standard blast furnaces. Operating data for five plants are herein presented.**

reduction is usually a mixture of cokebreeze and coke in the ratio of 2 to 1. Charcoal, lignite, pea coke and anthracite, as well as any charred products, can be and are used. Practically the only carbon acting as a reducer is the fixed C contained in the materials, leaving the volatiles of less value. About 900 lb. of coke are necessary to produce 1 long ton of pig iron, which is less than one-half the

amount of coke used in the standard blast furnace. This is of importance as it decreases the amount of objectionable impurities that enter the charge in the coke ash, and affects the pig iron quality. The lower coke consumption consequently also decreases the consumption of fluxing materials.

Any kind of pig iron may be produced in the Tysland-Hole furnace and a silicon content up to 5

FIG. 5—This is the front view of a 7500-kva. Tysland-Hole furnace, which is in operation in Southern Europe.



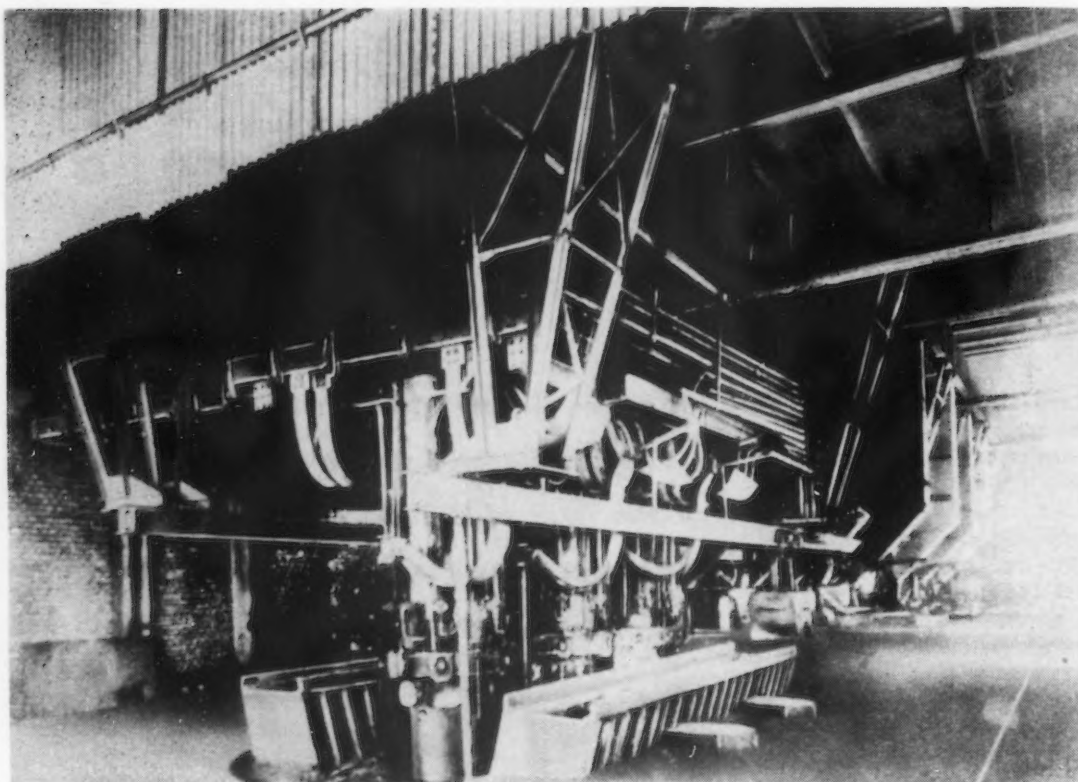


FIG. 6—View of the Tysland-Hole furnace from the charging floor. A small amount of escaping gas can be seen burning along the rim of the charging trough.

per cent can easily be obtained. The carbon content is about  $4 \pm 0.2$  per cent depending on silicon content. The conditions in this furnace are very favorable for removing sulphur and a low-sulphur pig iron can be produced even when there are considerable amounts of sulphur in the charge. The furnace also produces an excellent quality iron with coke as the reduction material.

#### Desulphurization

Removal of sulphur is due to a high temperature in the reduction zone which enables operation with a slag of high basicity. The trapped slag is taken care of by any of the usual methods, but is often granulated and utilized in the production of cement.

The gas is a valuable by-product, and is usually used for heating purposes, particularly if the iron plant is integrated with a steel plant. A still better utilization is obtained, however, by converting the gas in chemical processes for organic synthesis. The gas may also be used for sintering of fine iron ores and for producing sponge iron. About 23,000 cu. ft. of dry gas is produced per ton of pig iron. A typical analysis of the gas is the following:

	Vol. Per Cent
CO <sub>2</sub>	15
CO	72
C <sub>m</sub> H <sub>n</sub>	3
H <sub>2</sub>	8
N <sub>2</sub>	2

Its heat value is approximately 260 B.t.u. per cu. ft., thus representing approximately 500 lb. of 12,000 B.t.u. coal for each ton of pig iron produced, which in the gas state has a higher value and efficiency.

The power consumption per long ton of pig iron is 2200 to 2600 kw-hr., this representing an ore of normal iron content, and an iron containing 0.50 to 2.5 per cent silicon. A higher silicon content requires a somewhat higher power consumption.

The electrode consumption is normally 18 to 24 lb. for each ton of pig iron.

All Tysland-Hole furnaces are equipped with the Söderberg self-baking and continuous electrode, which was also developed by Det norske Aktieselskab for Elektrokemisk Industri. This type of electrode is especially adapted for use in electric ore smelting because of its simplicity and economy in operation. Because of its construction, it has a very high resistance against corrosion. It stands up against high current densities and, being a continuous electrode without joints, its maintenance or

“slipping” never requires interruption of the operation.

Because of its low cost and high efficiency in operation, the Söderberg electrode has played an important role in the development of the electric processing of ores in general and especially of iron ores for producing iron.

#### Electric vs. Standard Blast Furnaces

Actual competition between blast furnaces and electric furnaces does not exist since the conditions under which one or the other is more economical are rather sharply defined. The main factor determining the process to be adopted is the price relation between coke and electric power.

Nature has seldom provided any one locality with both good coking coal and the means for developing cheap hydro-electric power. Electric power generated from coal is as a rule too expensive for electric ore smelting.

A brief thermal calculation of the economic equilibrium between blast furnace and electric furnace for the same kind of reducing agent shows, that this would be maintained if the price of 1 lb. coke is equal to about 1.8 times the price of one kw-hr. However, this is not the only deciding factor in choosing the smelting process. Several other factors are to be taken into consideration, not all

of them as easy to judge in an economical balance. Below are listed some of the advantages offered by the electric smelting process:

(1) High degree of independence as to physical conditions of the raw materials, especially the reducing agent. This makes it possible to use a cheap reducing material and to produce pig iron in localities where it previously had to be imported, thus saving the freight expenses.

(2) As less than one-half of the reducing agent as contrasted with the blast furnace is required, requirements of flux, etc., are less and the amount of produced slag is lower.

(3) As a consequence of point (2) fewer undesirable impurities are contained in the charge; it is therefore possible to produce a higher grade of pig iron than could be produced in the blast furnace with the same materials.

(4) The process offers excellent desulphurization, permitting the use of raw materials which were formerly considered impossible.

(5) Great flexibility exists in operation as to iron specifications, and the possibility of producing different kinds of pig iron in short intervals. The silicon content in the pig iron, variable within wide ranges, is easily and quickly regulated by changing of the amperage only, as this also regulates the temperature in the reduction zone.

(6) As furnaces are continuous and operate smoothly, they have a high load factor and act favorably upon the power factor along the whole power line. Power producers should, therefore, favor such furnaces, and a favorable

power rate would thus be expected.

(7) Flexibility in load makes it possible to take care of peak and excess power. With a possible variation of 50 per cent in load, the furnaces may be considered as "accumulators" of electric power. This should enable a consumer partly to balance his power consumption by operating with power of cheaper rate, for example, at week ends and holidays. It may be mentioned that it is already the practice of one of the larger steel plants, in times of power shortage, to operate a Tysland-Hole furnace only during week ends. It has been proved within four hours after having been switched on that the furnace is operating with normal load, despite having been without load during the week.

Some other conditions favoring the electric furnace may be mentioned. One is that erection cost per ton of pig iron is lower than for blast furnaces. Another, is that in the case of blast furnaces, production cannot be expected until the entire plant is erected and this may take 15 to 20 months. An electric smelting plant is erected in units and the production can start as soon as one unit is completed (6 to 8 months). The erection of the entire plant is made successively. In case the conditions change during erection, this can be discontinued at any time.

As for the disadvantages, those have been briefly mentioned before. They include a somewhat higher operating cost with respect to manpower and dependence on cheap electric power. There is, however, no doubt that production costs can be reduced considerably by extensive mechanization.

For countries with limited coal resources, electric pig iron production will be of utmost importance. It will save their irreplaceable stock for products having no substitute for coal.

#### Operating Data

By using an ore of 55 to 60 per cent iron content for producing a pig iron with a silicon content of 1.0 to 2.0 per cent, the approximate production capacities of the Tysland-Hole furnaces (load factor 0.95) are:

Transformer Capacity in k.v.	7500	12000	15000
Daily pig iron production in long tons	50 to 55	90 to 100	115 to 125

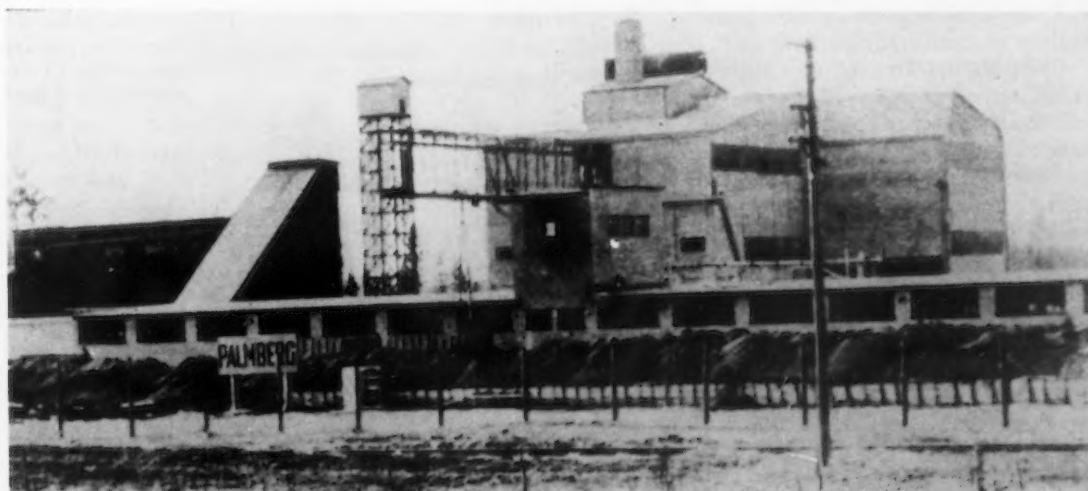
The slag weight will vary with the silica content of the ore and the amount of silicon desired in the pig iron, as the silicon is reduced from the slag. Thus, a higher silicon content in the pig iron will reduce the amount of slag per ton of iron.

Although the amount of slag can be kept very low, a certain quantity (about 700 lb. per ton pig iron) is usually desired for metallurgical reasons. There are no technical matters obstructing the processing of poor ores, only economical.

The power consumption for the above mentioned ore is 2400 to 2600 kw-hr, per long ton of pig iron, depending on the slag amount and the silicon content desired in the pig iron. For every increase of 1 per cent silicon an increase of 90 kw-hr, per ton of pig iron may be safely calculated.

Electrode consumption amounts to 18 to 22 lb. per ton of pig iron, depending to some extent on slag amount and silicon content in the

FIG. 7—This 12,000 kva. plant has a briquetting plant for the raw material (pyritic calcines) in the foreground.





pig iron and kind of reducing agent used.

As for coke consumption in case of a coke containing 10 to 12 per cent ash, it may be calculated with 850 to 900 lb.

In this country with its high labor wages and extensive mechanization, it is estimated the labor in man-hour per ton pig iron will be 2.5 to 1.5, depending on the number and size of furnace units, the higher figure applying when only one furnace is in operation. Two-thirds of this is for the furnace operation, the remainder for miscellaneous labor.

Below are given some operating data from different plants:

#### PLANT A

Tysland-Hole furnace with transformer capacity 12,000 kva.

Ore: Foremost sintered hematite and magnetite concentrates.

Pig iron in per cent of charged materials (except reducing agent), 54.3 per cent.

Consumption Per 1 long ton pig iron		
Reducing agent	(Charcoal 50% Coke, 50%)	Only Coke
Power consumption	2380 kw-hr.	2474 kw-hr.
Reducing agent, re-calculated on coke with 11.5 per cent ash	860 lb.	840 lb.
Electrodes	18.7 lb.	20.7 lb.

Operating time in per cent of total for about six months 97.3 per cent.

The average load was only 70 per cent of capacity as operation had to take advantage of peak loads.

Pig iron produced (High grade for special steel):

C 4.0 per cent or above, Si 0.8 to 1.5, P less than 0.025, S less than 0.010.

#### PLANT B

Tysland-Hole furnace with transformer capacity 12,000 kva.

Ore: Briquettes of pyritic calclines, mainly from pulp plants.

Pig iron in per cent of charged materials (except reducing agent), 46.3 per cent.

Reducing agent:	Per Cent
Charcoal	17
Coke	50
Coke Breeze	33

Average for 7 months operating time:  
Power consumption 2525 kw-hr. per long ton pig iron

Reducing agent (As coke 11.5 per cent Ash)	885 lb.
Electrodes	21.5 lb.
Operating time in per cent of total	98 per cent

The average load was 80 per cent of capacity; full capacity could only be used during week ends.

Pig iron produced: High grade, C about 4.0 per cent, Si 1.25 to 1.75.

P less than 0.028, S less than 0.010.

#### PLANT C

Tysland-Hole furnace with 7500 kva. capacity.

Ore: Quartzose hematite of composition Fe 48.0 to 50.0, SiO<sub>2</sub> 28.0 to 24.0, Al<sub>2</sub>O<sub>3</sub> 3.0, P and S low.

The coke had a high ash content, 22 to 28 per cent, and P 0.075, S about 1.5 per cent.

Due to the high silica content in the ore and ash content in the coke, the slag amount was 2800 to 3000 lb. per ton of pig iron, which is more than three times the usual amount.

Pig iron in per cent of materials (except reducing agent), 30 to 32 per cent.

The furnaces operated very smoothly with such a large amount of slag; power consumption was, of course, high, or about 3000 kw-hr. per ton pig iron.

The pig iron analysis: C about 4 per cent, Si 1.25 to 2.00, P less than 0.045, S less than 0.030.

The furnaces were operated during nine months of the year, because of seasonal power shortage.

#### PLANT D

Tysland-Hole furnace with 12,000 kva. capacity.

Ores:	Per Cent
Siderite	S = 0.50
Agglomerated ore	S = 0.21
Coke: Ash, 12 per cent	S = 1.1

Pig iron in per cent of materials (except reducing agent), 43.5 per cent.

Average per long ton pig iron for three months:

Power consumption	2695 kw-hr.
Coke 11.5 per cent ash	895 lb.
Electrodes	22.8 lb.

Average load 98 per cent of capacity.

Pig iron produced: C above 4 per cent, Si 2.0 to 2.5, Mn 2.5 to 3.0, P less than 0.55, S less than 0.020.

Below are mentioned the Tysland-Hole furnaces built at present, and their capacity.

Country	No. of Furnaces	Transformer Capacity, KVA.
Norway	1	6500
Norway	1	9000
Norway	2	16000*
Sweden	1	12000
Sweden	1	7500
Finland	1	12000
Italy	6	7500
Italy	2	12000
Italy	2	12000
Italy	1	12000
Japan	2	7500

The Tysland-Hole furnace has after only 14 years reached a high degree of development and has solved successfully the problem of electric pig iron smelting with a wide variety of reducing agents, including coke.

There is reason to believe that this furnace may be built in considerably larger units than hitherto. Furnaces of transformer capacity 25,000 kva are under design. Consideration is constantly being given to the increase of the furnace capacity in order to reduce the production costs and obtain the advantage otherwise offered by

\* This plant was to be built by the Norwegian government at the time of the invasion of Norway. How far it has progressed is not known.

large units. To what extent this shall succeed, time alone will show.

# Time and Materials Saved

## *In Making Stripped Turret Lathes*

**I**N the present war emergency, machine tool builders are faced with a dilemma. Demand has skyrocketed to unheard of levels, but the need for steel and alloying elements for direct war production is so great that the machinery builders are hard pressed to obtain sufficient materials to meet the new production goals. Several months ago, use of nickel steels for gears and shafts was ruled out, as was the use of nickel in castings. In general, the industry is swinging over to the National Emergency steels and is revising its heat treating practice to take care of these low alloy materials, but the Production Requirements Plan so far has not envisioned even enough of the substitute steels for current requirements. Material shortages are the biggest problem facing the industry today.

Anticipating this situation, Gisholt Machine Co., Madison, Wis., has developed a line of heavy duty saddle type turret lathes, Fig. 1, in which much of the requirements in steel parts have been replaced by high strength cast iron parts. These machines are now being produced in a new plant equipped with machinery provided by government funds.

In order to achieve maximum production of these new turret lathes in a minimum of time, it was necessary to design a machine which could be produced on machine tool facilities then available or readily obtainable. It was also necessary to plan the design-construction of the turret lathe around materials which are readily available in the large quantities necessary.

**... How Gisholt Machine Co. has built a streamlined version of a heavy duty turret lathe in which critical alloy steels have been largely eliminated and man-hours reduced by design simplification.**

The war machines are made in two sizes at present, designated as the 3R and the 4R turret lathes. Capacities correspond to the conventional 3L and 4L machine made by Gisholt for the past several years. The table on p. 59 gives the principal specifications.

### **Cast Iron Spindle**

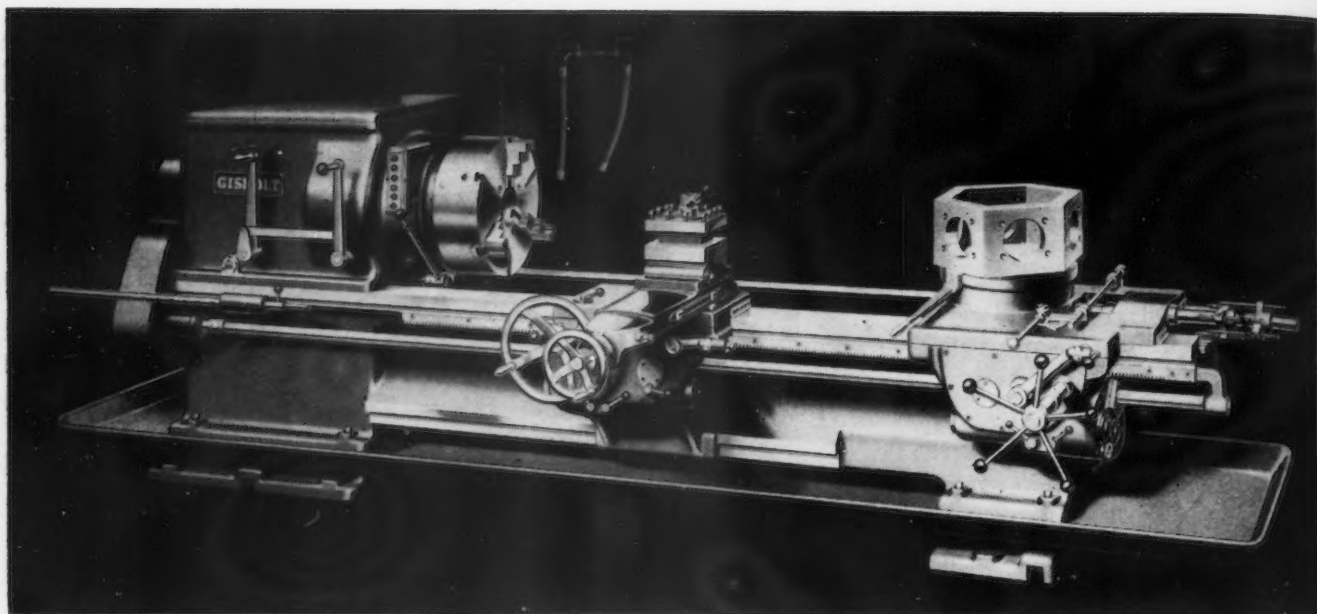
The chief changes in material specifications are in the headstock. The headstock itself is cast as a separate piece instead of being integral with the bed. This simplifies what are normally planing operations on the composite bed casting and has also simplified the jiggling of the headstock for the boring operations. The main spindle is now a semi-steel casting instead of a forging made from SAE 1035 steel. While no critical alloying elements are used in the standard L series spindle, the shift to high strength cast iron has relieved the demand on the capacity of heavy forging suppliers which are loaded up with direct war work.

This spindle casting is made in Gisholt's own foundry, the cupola metal charge consisting of approximately one-third short rails, one-third "machinery cast" scrap and the remainder pig iron. To make up for the difference in tensile strength, the semi-steel casting is made with a heavier wall section

than the forged spindle of the corresponding L model. For example, the through hole in the 3R spindle may be either  $5\frac{1}{4}$  or  $6\frac{1}{4}$  in. in diameter and for the 4R,  $9\frac{1}{4}$  in. The corresponding spindle bores for the 3L are  $6\frac{1}{4}$  and  $7\frac{1}{2}$ , and for the 4L,  $9\frac{1}{4}$ ,  $10\frac{1}{2}$  or even  $12\frac{1}{4}$  in. As before, the spindle is carried in double row Timken bearings at front and rear, and these bearings sizes have not been changed.

Manufacture of this cast iron spindle is of interest. The through hole is cored and the first operation is to bore this out to size in a special Gisholt lathe with 5 ft. extension, Fig. 2, to take care of the long boring mounted on what would ordinarily be the turret carriage. Four carbide cutters are mounted in the bar and coolant is piped to them through the bar itself.

Next the o.d. of the spindle is turned in a Monarch lathe with a Keller attachment to speed up operations on the multi-diameters. This includes turning and facing back of the flange. Flange facing, turning and taper boring for the spindle nose is completed as a second operation in a turret lathe. Incidentally, the fact that the material is a high strength iron enables much faster turning speeds to be employed than is the case in turning a normalized steel forging. The application is ideal for car-



**FIG. 1**—The Gisholt "R" series turret lathe is a heavy duty simplified design, in which critical materials have been eliminated as much as possible.

o o o

bides. This, together with the fact that there is only one fixed gear on the spindle has reduced materially the number of man-hours to complete a spindle.

Bearing seats for the roller bearings are ground in a 24 x 120 in. Landis plain grinder, using a coarse open-structure wheel.

#### Simplified Headstock

Other shafts in the headstock, Fig. 3, are of steel, but the gear engaging mechanism has been simplified in design to eliminate spline shafts and sliding gears. On the shaft which carries the pinion engaging the spindle gear, for example, double tooth clutches are employed, while on the third shaft a pair of disk clutches are found.

Ampco metal is used for the jaw clutch keys. For the pinions, SAE 1045 replaces SAE 2350 nickel steel gears or SAE 4340 chrome nickel molybdenum oil hardening gears. These SAE 1045 gears are not hardened and ground, but are hobbed and shaved in the normalized condition. The big gear on the spindle is high strength cast iron, as are

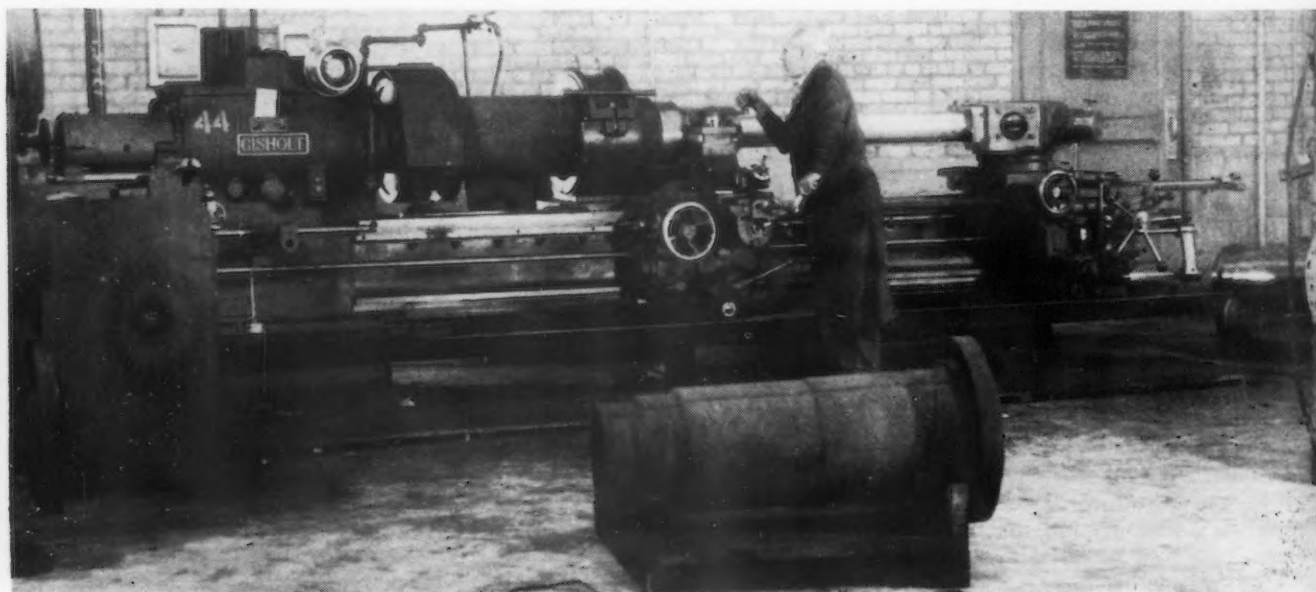
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**FIG. 2**—Boring and turning one end of the high strength cast iron spindle, shown in foreground, in a modified Gisholt turret lathe with extended bed.

the larger gears in the train. The loss of strength under hardened alloy steel gears is made up by increasing the face width of these gears and making the pitch coarser.

To make up for the number of gears normally provided in the headstock, a two speed motor is provided. For the 3R lathe, motor power is 12 and 15 hp. at 1200 and 1800 r.p.m., respectively; for the 4R, 17 and 25 hp. Drive is by V-belt. Eight spindle speeds are available and four longitudinal and cross feed rates.

The feed train take-off gear is mounted outside the rear bearing for simplicity in assembly and four change gears are provided on the swinging quadrant. These connect with the single feed rod which





drives both the square turret carriage and the hexagon turret carriage. A full length lead screw is optional equipment. A wide angle helix lead screw for rapid traverse to the hexagon turret carriage is placed at the rear, thus simplifying the apron construction at the front considerably over the standard "L" type design. This rapid traverse screw has been adapted from an old Gisholt design that has not been used since 1925. It has right and left-hand threads of 45 deg., 4-in. lead.

#### Feed Changes Reduced

There are only four feeds in the box type aprons, feed being engaged through tapered friction cones. There are no apron reverse longitudinal feeds, but the square turret is provided with power cross feed in both directions. A feed dial is provided on the cross feed screw, but longitudinal feed dials have been eliminated from both aprons.

Simplification in manufacture has been achieved by making the base for the square turret separate from the cross slide and the base for hexagon turret separate from the carriage. This enables these bases to be chucked and bored on turret lathes instead of in big boring mills as in the case of the integral bases and slides or carriages on the standard lathes. Small as it is, the hole for the square turret post is ordinarily bored in a big mill just to get enough swing to clear the long tail of the cross slide. Similarly, the base for the hexagon turret can be chucked in a 4L turret lathe with a 24-in. swing. Otherwise a 7-ft. boring mill would be required to swing the full carriage because the turret center is offset at one end. The hexagon turret saddle is milled off flat and the turret base is located by dowel pins.

Locking pin and locking pin bushing are unchanged, being made of Hy-Ten M alloy steel. The longitudinal feed stops for each turret face have been made as simple as possible, consisting of a set of adjustable screws in a stop roll. The slot for the turret stop box is made of cold rolled steel bars, beveled in a miller. This eliminates the more difficult job of milling the slot in the bed. The composite box can be set screwed to a flat surface.

#### Special Tooling Provided

Making the headstock separate from the bed has simplified the jiggling for the headstock boring operations. With integral headstock and

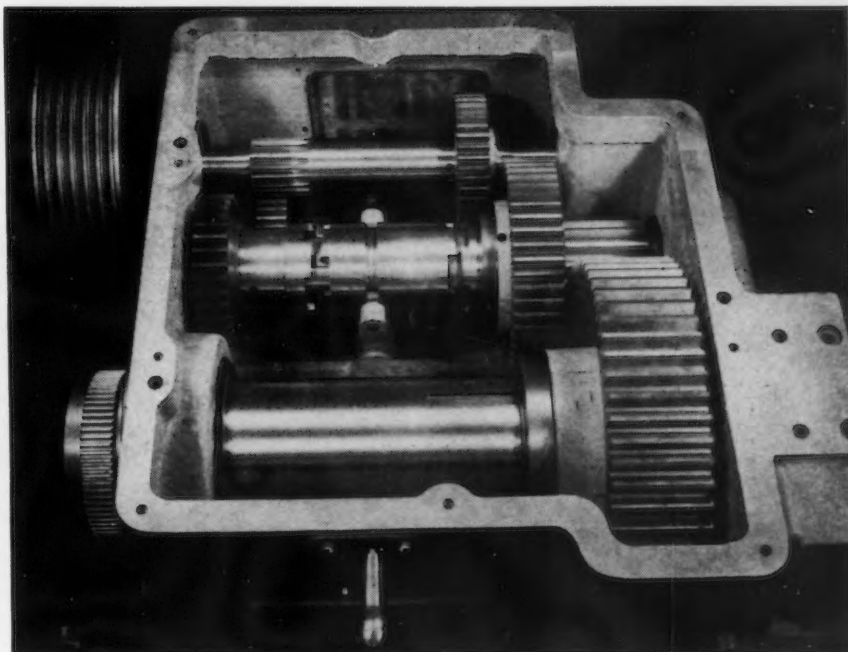


FIG. 3—Simplified gear train in the headstock. The large gears are high strength cast iron, the pinions SAE 1045 steel.

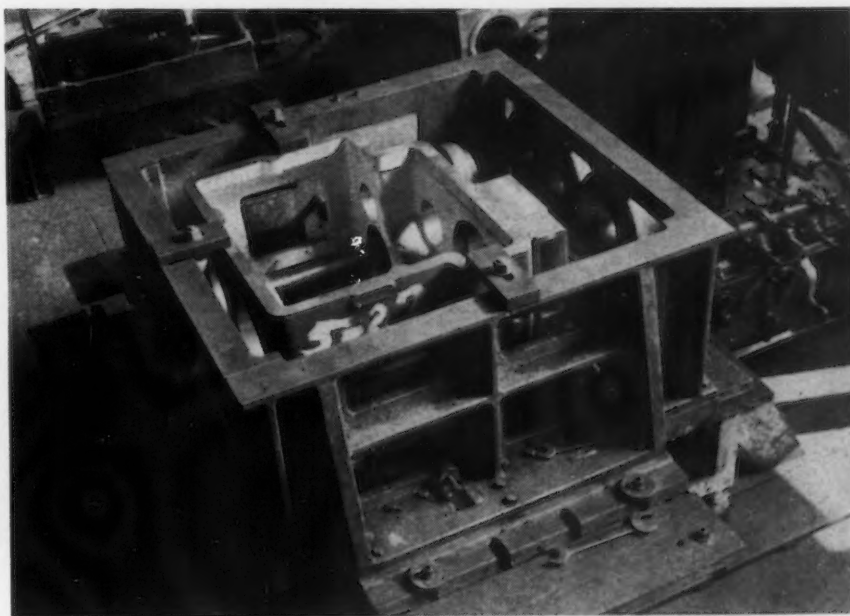
base construction such as is found on the "L" series, a huge trunnion type box fixture is necessary, capable of handling the entire assembly. Some of these trunnion jigs are used under big radials. For the "R" series machines, boring of the headstock holes is done in a Giddings & Lewis horizontal boring and milling machine, Fig. 4, using a simple boring jig.

The beds are milled in two set-ups in special planer type Ingersoll millers, while the carriages are machined in a special miller, Fig. 5,

with standard Kearney & Trecker heads. Because of their length, the base and table of this big miller were cast in the Gisholt foundry and machined in the planer department of the old shop. On this unconventional machine there are five heads on the rail, two on the front side and three at the rear. One of the heads is set at an angle to mill the dovetails. This set-up has greatly sped up what are ordinarily planing operations.

Output is also increased through the use of inserted tooth carbide

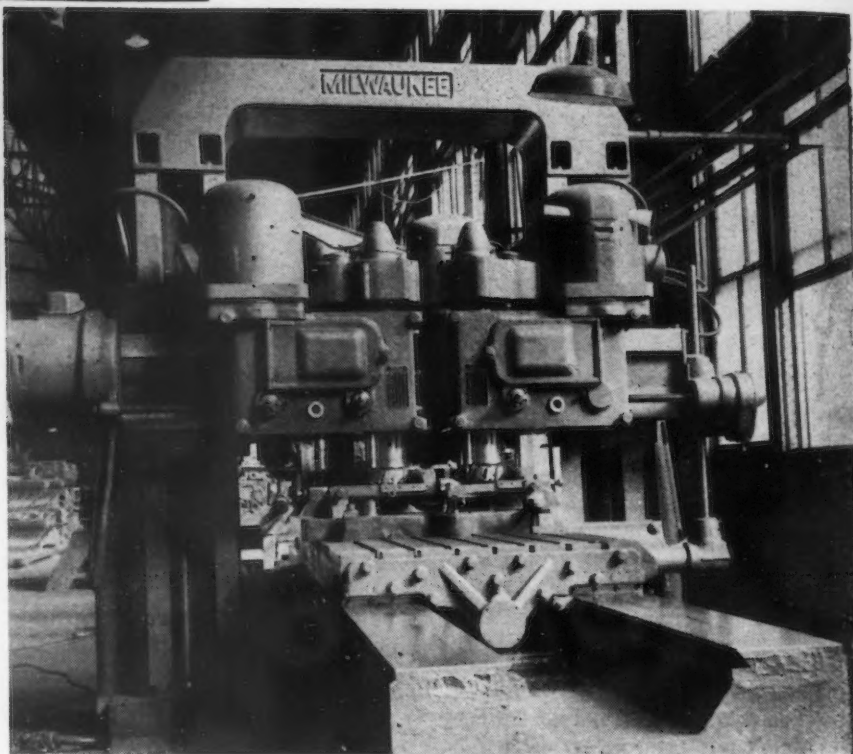
FIG. 4—Use of a headstock separate from the bed casting simplified the jiggling of this part for the boring operations in a G. & L. horizontal boring mill.



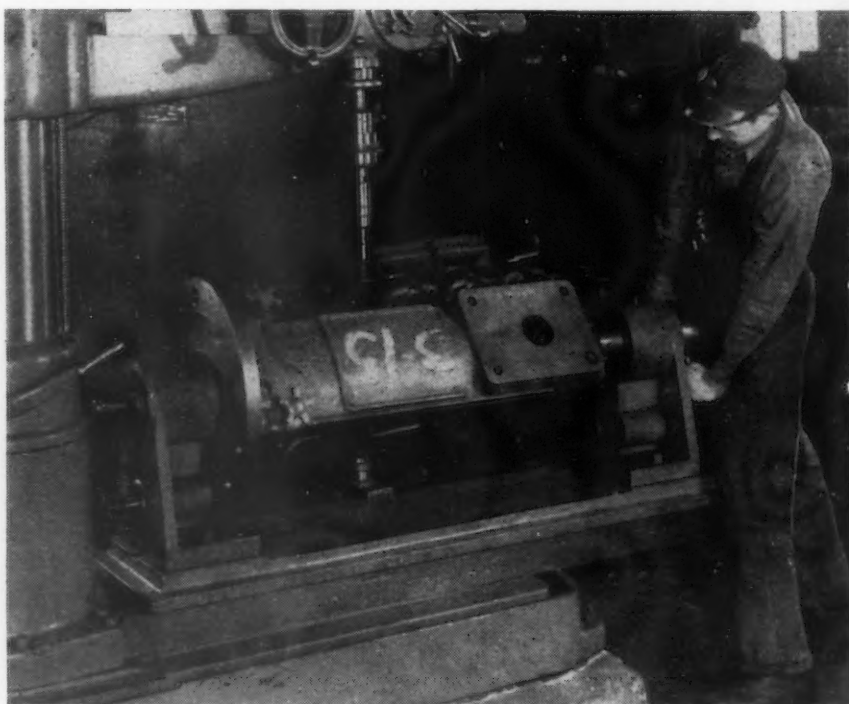


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FIG. 6—Box trunnion jig for headstock covers. This jig is rolled over with a rope sling and crane and the work is drilled from the bottom side to eliminate burrs on the face.

BELOW  
FIG. 5—A special miller has been devised to machine the square turret and hexagon turret carriages simultaneously. There are two inserted tooth milling cutter heads on the front rail and two heads on the rear rail, one with two vertical spindles and the other with a spindle at an angle.



BELOW  
FIG. 7—This indexing jig for drilling and tapping the three-point bearing mounting for the cross feed screw on the square turret carriage is another example of special tooling. The holes, equally spaced around a circle, are at the left end of the piece. One of the jig bushings may be seen to the right of the index plate.



tipped cutters. Most milling operations are performed at 300 surface ft. per min. with carbide blades.

Aprons are milled, then drilled and bored in a box trunnion jig under a 5 ft., 14 in. Cincinnati Bickford radial. An unusual design of jig has been built for drilling the top holes in the aprons. This is done with a 3 ft., 11 in. American radial. Headstock covers are drilled in a Carlton radial. The piece is loaded faced side down and clamped in a trunnion jig, Fig. 6, which is then rolled over by crane hoist with the aid of a rope sling. The cover is drilled from bottom side to eliminate break-through burrs from the machined face.

An example of design simplification to speed up production by eliminating fussy operations is in the bearing mounting for the cross-feed screw on the square turret carriage. This bearing is lined up by being supported by three equi-spaced radial screws in a mounting ring. This saves a precise reboring operation. Drilling and tapping of the screw holes in the mounting ring is done in a 3 ft., 11 in. column Bickford radial, Fig. 7, with the aid of a special 120-deg. indexing fixture. The carriage is located angularly in the fixture by a dovetail guide at the right end.

#### Old Plant Revamped

This is the second project to produce a simplified lathe under wartime conditions. Not long ago, Gisholt completed a contract to build a large number of modified ram type turret lathes for the British Purchasing Commission. On this



second project, much larger machines of the saddle type are being built for a War Department pool order under a Defense Plant Corp. contract. The machine facilities were installed in an old plant that had been allowed to go to "rack and ruin" after years of idleness. In January, 1941, when Gisholt made the decision to rehabilitate its old Northern Works, there was not a whole piece of glass in the building. The roof structure had been broken in several places and snow lay deep on the floor in some spots. Aside from "fixing up" this building early in 1942, the company erected a 50,000 sq. ft. addition, in a matter of a month.

Most of the planer and milling operations on bases, headstocks, carriages and saddles are done in the old building to eliminate backtracking of heavy castings. Final assembly is done at the end of the machine lines. Subassembly operations on the headstock are performed in a small section connecting the old and new structures. This used to be part of the power plant. A number of jib cranes with  $\frac{1}{4}$  and  $\frac{1}{2}$ -ton electric hoists have been installed here and at many other points throughout the plant to facilitate handling of heavy units. After assembly, the headstocks and aprons are loaded on pallet skids and are trucked to final assembly. Incidentally, this subassembly section is the only area where there is any provision for storage facilities. Parts like gears, shafts and bearings are stored in bins under the assembly benches. But there is no stockroom, as such, in the plant. The plan is to keep things moving in a steady flow to subassembly and assembly. Units are put through in lots of 50 as far as small components are concerned.

#### New Plant Erected

In the new structure is the set-up for machining the semi-steel spindles, and all engine and turret lathe work on gears and shafts is done here. Other jobs carried on in this department include gear hobbing and shaving, Fig. 8, external and internal grinding of cylindrical work and surface grinding of flat work, Fig. 9. Many small castings that are first end milled flat are later surface ground to obtain oil tight fits.

For the standard line of Gisholt turret lathes and semi-automatic lathes, hardened and ground steel plates are screwed to the bed ways. This feature is eliminated from the

### Gisholt Specifications for Simplified Turret Lathes

Model designation	3R	4R
Diameter of three-jaw scroll chuck, in.	21	24
Swing over the ways	28 $\frac{1}{2}$	31
Swing over the cross slide, in.	21 $\frac{1}{2}$	24 $\frac{1}{2}$
Spindle bore, in.	5 $\frac{1}{2}$ and 6 $\frac{1}{4}$	9 $\frac{1}{4}$
American Standard Type A1 spindle nose, diam., in.	15	20
Width across ways, in.	22	26
Travel of turret carriage, in.	50	60
Width of turret across flats, in.	16 $\frac{1}{4}$	20 $\frac{1}{4}$
Travel of square turret carriage, in.	50	60
Cross travel of square turret, in.	12	15
Width of square turret, in.	8	9
Number of spindle speeds	8	8
Range of spindle speeds, r.p.m.	13 to 270	8-166
Number of turret and side carriage feeds	4	4
Range of standard longitudinal feeds, in. per rev.	.003 to .051	.003 to .051
Horsepower of motor	15	25



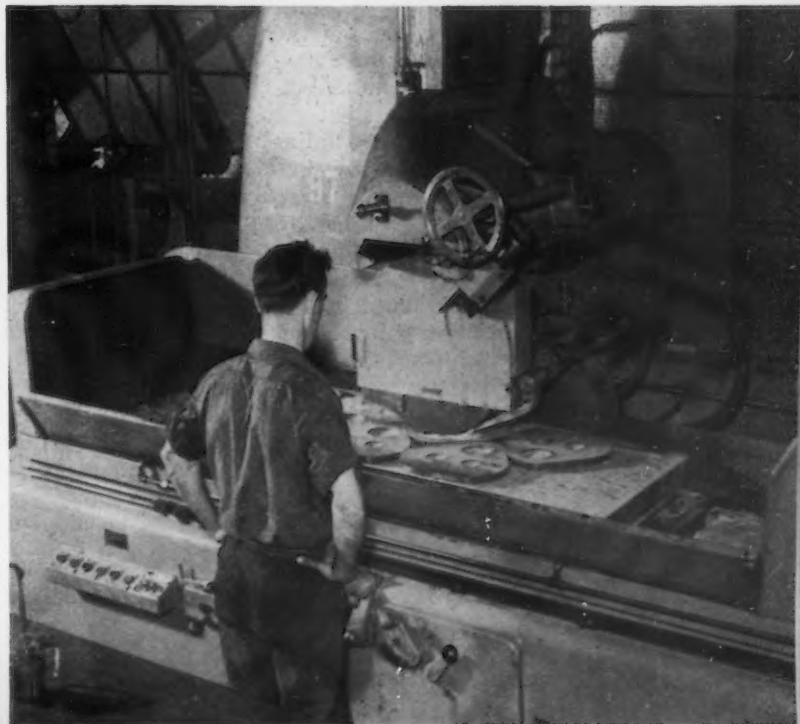
LEFT

**FIG. 8—Hobbing of semi-steel main spindle bull gear. Loss of strength compared with an oil hardening alloy steel is compensated by the use of a wider face and coarser pitch.**

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BELOW

**FIG. 9 — Surface grinding of flat work that has been previously milled. This operation produces an oil tight fit without the use of gaskets.**





"R" series machines, so there is no need for surface grinders for these plates. As far as possible, ways will be milled and not planed, and scraping and spotting will be avoided as far as possible. This will save a large number of man-hours of labor ordinarily expended on machine tools for this work. This is in line with the practice of at least one of the manufacturers of large planer type millers.

Another section of the new plant is devoted to chuck manufacture. This is set up on practically a line production basis, beginning with the turret lathe operations on the rough forgings, Fig. 10, and going through a number of drilling and milling operations. For cutting the scroll teeth, however, the scrolls are sent over to the main plant to take advantage of a special set-up which has been devised to do this work on a turret lathe. At present standard Gisholt tools are furnished with these lathes, and the new plant has been equipped to produce them.

Thus it can be seen that many short cuts have been taken to pro-

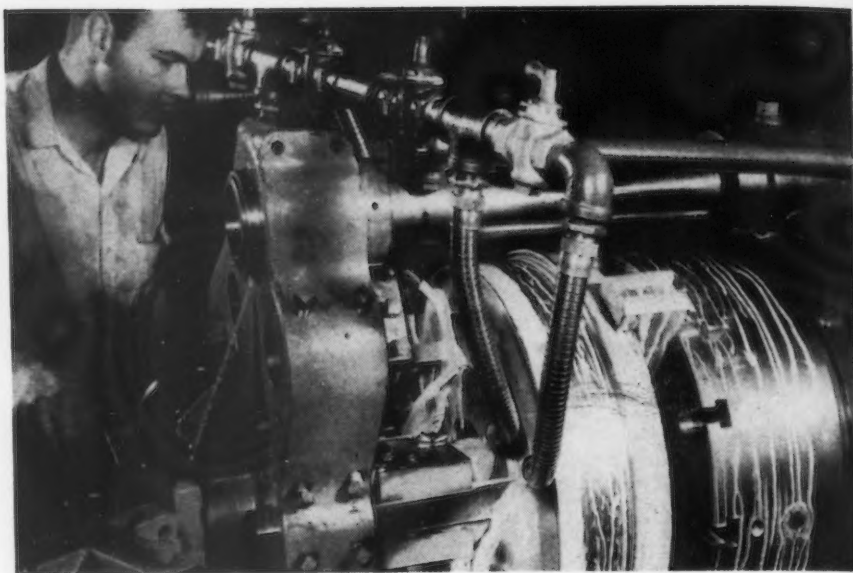


FIG. 10—Scroll chuck body being turned on one of the new 3R model lathes. Indicative of the capacity of these machines, this big forging is being turned at 280 ft. per min. and 0.009 in. feed, using carbide tools.

duce a heavy duty turret lathe that will deliver dependable service on war work. After the emergency, it will be possible to rebuild the machines for longer life. It will be a simple matter, for example, to remill the bed and add hardened and

ground ways. It will also be feasible to re-equip the headstock with hardened and ground gears if desired. In the meantime, the production of badly needed turret lathes in these big sizes will be greatly increased.

## Accelerated and Retarded Phosphatizing Methods

A QUANTITATIVE examination of phosphatizing baths to which accelerators are added to shorten the phosphatizing period has been reported in *Korrosion und Metallschutz*. The author, W. Machu, included in his investigation the study of porosity of the phosphate layer, of the variation of the potential during the treatment, of the pore resistance and of the thickness of the phosphate layer, and arrived at the following conclusions.

The study of the effect of addition of nitrate, nitrite, bichromate, bisulphite, copper salts, quinoline, and various inhibitors and accelerators on the free pore area and on the variation of the potential during phosphatizing showed that the porosity of the phosphate layer is only very slightly increased by the presence of these accelerators. The simplest means of establishing the end-point of phosphatizing is the observation of the potential of the treated material, since the time-potential curve strictly obeys the Müller auto-passivation law. Even in the presence of accelerators, the phosphatizing time is more than doubled after pickling. The thickness of the phosphate layer can be

deduced from the current-time curve; for bonderized and Granodine layers  $2.2 \times 10^{-3}$  and  $1.3 \times 10^{-3}$  cm. respectively were found. The protective value of the phosphate layer cannot be improved by continuing the phosphatizing treatment after the free pore area and the potential have become constant. The pore resistance of the phosphate layer is about 2000 ohms also in phosphatizing baths containing accelerators. The addition of oxidizing agents in too high concentrations does not result in an acceleration of the phosphatizing process, since, owing to passivation of the iron, no phosphate layer is formed at all. The phosphatizing process is accelerated not only by oxidizing but also by reducing agents, such as sulphurous acid and salts of metals nobler than iron, that is, copper, lead, silver, mercury, and also by organic inhibitors, such as quinoline, dibenzyl sulphoxide and Rhodine. That these chemically dissimilar substances are all effective as accelerators is due to the fact that phosphate is deposited at local cathodes only, dissolution of iron taking place at the local anodes. The phosphatizing process must thus be considered as a combina-

tion of topochemical and electrochemical reactions. The accelerators enlarge the local cathode areas, and at the same time decrease the centers acting as anodes. All measures which increase the ratio of the cathodic to the anodic areas accelerate the phosphatizing process. Cathodic polarization of the treated material accelerates and anodic polarization delays the phosphatizing process. Polarization by alternating current has an accelerating effect, since the cathodic current impulse is more effective than the anodic one. Anodic treatment in acid phosphatizing baths does not result in the deposition of secondary zinc or manganese phosphates but in the formation of primary soluble iron phosphate, which lowers the protective value of the coating. Assuming that insoluble zinc and manganese phosphates are deposited at the local cathodes only, the author's electrochemical theory of the effect of accelerators explains in a simple way the effect of oxidizing and reducing agents as well as of metals nobler than iron, of organic inhibitors and of the application of electric current on the deposition of phosphate.

# Hints on Correct Broach Use

By HARRY GOTBERG

Chief Engineer, Colonial Broach Co.,  
Detroit

**A**LWAYS check the suitability of a broach for the specific job it is to do. The material, length of broached hole, broaching speed, broaching fixture and type of broaching machine all affect satisfactory broach performance. Make sure that the broaching machine is of adequate capacity. Broaching speed and smoothness of operation not only affect the broaching time, but also the quality of the work.

Don't expect a broach to correct excessive eccentricity due to inaccurate previous machining. Where close concentricity must be obtained, it is best practice to use the broached hole as the "locating point" for subsequent o.d. turning or facing operations.

When broaching from a cored hole in a casting or a forged hole, it is preferable to use an equalizing fixture to avoid excessive eccentricity of the load on the broach. When broaching from drilled holes, make sure that the hole is square with the face of the piece that contacts the fixture.

## Handling Broaches

Never permit the extremely hard cutting teeth of a broach accidentally to come into contact with a hard metal edge or surface since the teeth may be damaged. Preferably transport and store them in specially designed tote boxes or bins fitted with wood or other soft materials.

## Grinding

Grind only enough metal from each tooth of a broach to bring it to required sharpness. Only a few special broaches require that the same amount of metal be removed from every tooth. Use adequate equipment, designed especially for broaches, when sharpening them. Broach life is materially shortened if correct tooth form is not main-

tained and the broach is not held properly in the sharpening machine. Use a grinding wheel of the proper grain, grade and size when sharpening broaches.

## Proper Set-up

In making any broaching set-up, check the alinement of the puller and guide bars (if used) with the centerline of the faceplate or platen before mounting the fixture. In hole, spline and keyway broaching operations, check the alinement of the fixture with the centerline of the broach, puller and guides before starting operations. In helical spline broaching, keep backlash and wear of the broach drive head and lead bar at a minimum.

## Fixture Design

Design the broaching fixture or faceplate adapter used in round or spline broaching for as small a clearance as possible without making it too difficult to insert and remove the piece to be broached. In all surface broaching operations, make sure that the fixture is sufficiently rigid to prevent movement of the piece. Design the holding clamps which retain the piece in the fixture so that the piece cannot slip during the broaching operation, even if an unusually heavy load is encountered, such as one due to additional metal in a forging or casting or to a hard spot. Design all indexing mechanisms so that no backlash can occur while a piece is being broached.

## Operation Precautions

Always complete the broach pass and remove the piece before reversing the machine and returning the

broach to initial position. Before starting the broach pass, make sure that the piece is firmly and fully seated in the fixture. Slippage or "jumping" of the piece during the pass may break the teeth from the broach (surface broaching) or break it in two (hole broaching).

If a broach becomes stuck in the work (due to failure of power supply, etc.) never reverse the machine or try to push the broach out backwards under power. Tooth breakage is almost certain to occur. Should the piece become stuck onto the broach (internal or hole broaching), remove the piece from the broach by one of the following methods, after first carefully removing both stuck piece and the broach from the machine.

- (1) Gently tap the piece evenly and slide it off the starting end of the broach. If this does not work, then
- (2) Place the stuck piece and broach in a lathe and turn the piece from the broach, or
- (3) Saw the piece in two with a hack saw and thus free the broach.

In surface broaching, if the broach becomes stuck before the pass is completed, proceed as follows:

- (1) Loosen the piece in the fixture by unclamping it, if a non-retracting table or fixture is used. Then loosen the fixture and withdraw it from the broach.
- (2) If the broaching machine has a receding table, carefully retract the broach table. Only the lightest force should be used while doing this.
- (3) Check the broach, fixture and table to make sure that no broken parts of the piece will catch between the fixture and broach when the broach is returned to starting position.



# Low-Tin and Tin-Free

IN the preceding part of this article it was intimated that emergency specifications were soon to be issued in England for certain low-tin content gunmetals and brasses as a conservation and scrap salvage measure. At the same time, consideration was being given to similar emergency rulings on types A and B brasses with the result that some difference of opinion occurred regarding the foundry practice which would be most satisfactory in casting the new specification brasses.

The British Standards Institution issued the following War Emergency Specifications for types A and B cast brasses.

	Type A	Type B
Copper .....	70 to 80 per cent	62 to 70 per cent
Tin .....	2 per cent max.	2 per cent max.
Lead .....	1 to 4 per cent	1 to 4 per cent
Zinc .....	remainder	remainder
Aluminum .....	0.01 per cent max.	0.25 per cent max.
Iron .....	0.75 per cent max.	0.75 per cent max.
Nickel .....	1.0 per cent max.	1.0 per cent max.
Manganese .....		0.25 per cent max.
Metals other than those specified .....	0.5 per cent max.	0.5 per cent max.

This precipitated a question in the minds of the Non-Ferrous Subcommittee on War Emergency Specifications, a committee of the Institute of British Foundrymen, regarding the casting properties of the various types and caused them to engage E. J. L. Howard and J. Arnott in a practical investigation of the problem.

In discussions held by the committee, concerning lower tin content gunmetals and cast brasses, it was the consensus that little difficulty would be experienced by the non-ferrous founder in connection with the production of gunmetals to the new specifications. However, it was felt that trouble might be encountered with the cast brasses.

Howard learned that the methods of running castings made of either type A or B brass need not differ

from those adopted for bronzes unless the Cu content of the type B is on the low limit and the aluminum on the high limit—which causes the type B to closely resemble manganese bronze. In such cases, molding methods similar to those adopted for manganese bronze should be adopted due to the high rate of shrinkage.

Both the A and B alloys run well and give a good casting surface. The type of sand and mold dressings used for bronze is quite suitable for the production of sand castings and it has not been found necessary to adopt excessive venting. It is advisable to pour both alloys at a lower temperature than

that adopted for bronze as high casting temperatures appear to cause scabbing and poor casting surface.

Some results obtained by Howard with test bars melted under normal foundry conditions from scrap metal are tabulated in Tables VIII and IX. These bars were cast in green sand molds at about 1830 deg. F. It will be seen that all of the bars readily meet the proposed British specifications for both physical properties and chemical analyses.

Mr. Arnott, following a very practical method of investigating the problem, set out to determine whether any difficulties would be encountered in making a medium sized casting in type B brass using the molding and gating methods commonly adopted for gunmetal.

The example chosen was an air pump cover which weighed about 240 lb. in the rough; measuring about 30 in. in diameter. It was made in dry sand, run from the rim with one main riser on the elliptical flanges. These feeding arrangements are not overly generous but do give satisfactory castings in gunmetal. See Fig. 4.

The metal used was scrap naval brass rod ends and turnings from machine shops. The only addition in melting was a quantity of zinc sufficient to balance that lost during melting. Since this test was made before issuance of the British Emergency specification for type B cast brass, the metal does not quite meet their requirements for lead content.

The analysis of the casting was as follows:

	Per Cent
Cu .....	60.46
Sn .....	1.20
Pb .....	0.54
Zn .....	37.53
Fe .....	0.17
Ni .....	trace
Mn .....	nil
Al .....	0.04

The aluminum was estimated by the mercury cathode method and the figures given may be considered accurate to less than  $\pm 0.01$  per cent.

The rough casting looked quite satisfactory; there were no signs of shrinkage defects or sinks. However, when it was machined, a number of small shrinkage tears were found in the bore and on the outer flanges. See Fig. 3. These defects were not considered serious due to their slight depth but they would be considered objectionable in a high quality casting.

It is thought that modified gating and feeding methods would eliminate these imperfections but it is interesting to note that in a casting



# Bronzes and Brasses

of this size the differences in characteristics between gunmetal and type B brass are distinctly noticeable. Physical properties were also studied by both Howard and Arnott the results of which will be discussed later in this article.

F. Hudson, also of the sub-committee, made some interesting statements with regard to foundry practice for type A and B brasses as a result of his studies of sand cast low-tin gunmetals and brasses.

His findings indicated that type A brass has good castability and is not difficult to handle in the foundry. It is suitable for small pressurework and the best results are obtained in this direction at the 80 per cent copper end of the compositional range. The presence of tin and lead assists the production of sound castings but care must be taken to exclude aluminum as far as possible. Over 0.01 per cent of this element will produce excessive porosity.

The production of brass castings also entails the use of more permeable molds than used for gunmetal, particularly in the case of green sand work. Gating and feeding methods required are similar to those used for gunmetal.

Type B cast brass is more difficult to handle, particularly as the 62 per cent copper end of the compositional range is approached. As most of the supplies of this material will be obtained from scrap, it is possible that manganese will also be present from time to time and it will therefore be advisable to handle this alloy in the foundry along lines similar to manganese bronze. This requires taking the precautions of providing heavier gates and risers than would normally be allowed for gunmetal. The presence of maximum tin and aluminum contents will tend to aggravate trouble and promote brittleness.

A guide to suitable pouring tem-

**... Concluding this two-part article, there is described the founding practice for type A and B cast brasses with particular emphasis on the similarity of type B casting methods and those required for manganese bronze.**

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peratures for type A and B brasses is shown below.

Section of Casting	Pouring Temperature, Deg. F.	
	Type A	Type B
Light.....	2192-2012	2102-1922
Medium.....	2012-1922	1922-1832
Heavy*.....	1922-1832	1832-1778

\* Range for test bars.

Some suggested applications for the cast brasses are shown below:

## Type A, 70 to 80 per cent Cu.

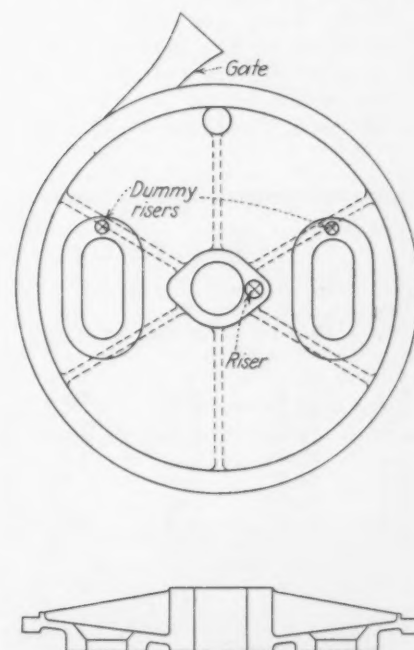
Suitable for low-pressure fittings working under mildly corrosive conditions (not recommended for use at elevated temperatures or for conditions requiring exceptional wear and tear), e.g., cocks, taps, pipe connections and sanitary fittings for use in fresh water at pressures up to 100 lb. per sq. in. Ventilating valves. Name plates. Lubricators. Better resistance to oils containing sulphur than gunmetal, therefore can be used with advantage for valves and fittings handling fuel oil and gasoline.

## Type B, 62 to 70 per cent Cu.

Non-pressure structural and ornamental castings. Pressure gage and telegraph cases. Voice pipe fittings and connections. Funnel fittings. Hand wheels. Gear case covers. Steering wheel brackets. Porthole and skylight casings. Motor-boat deck fittings. Bearing backings where a copper alloy is required and the backing need not in itself possess bearing properties.

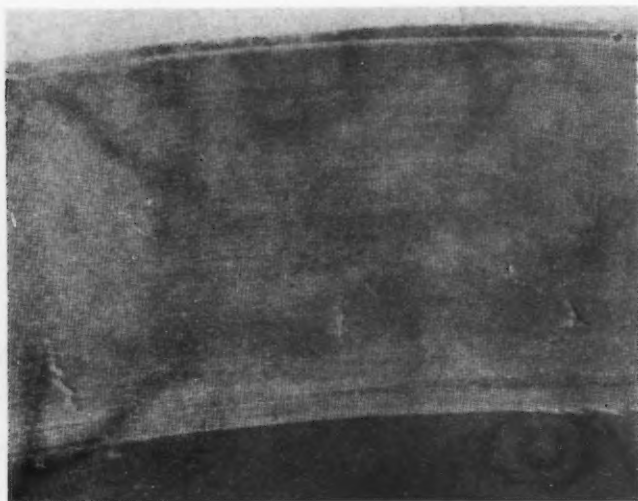
A part of Howard's study of types A and B alloys included an investigation into their physical characteristics. He found that the

addition of lead to these alloys makes them particularly easy to machine and enables sleeves and bushings made from them to run together without seizure occurring. Tests were made to ascertain the

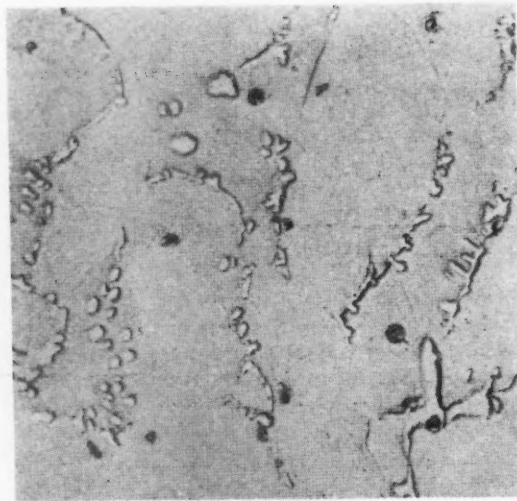


**FIG. 2—Diagram of the gating and feeding method used by Arnott in casting the 240 lb. air pump cover of type B brass.**

effects of running sleeves and bushings of these alloys under heavy load with water lubrication. For the purpose of the test a sleeve was mounted on a shaft and rotated at 1500 r.p.m. with a stationary loaded bushing located around the



**FIG. 3**—The outer flange of the air pump cover, cast in Arnott's tests, showing the small shrinkage tears.



**FIG. 4**—The micro-structure of this type B brass at 500 diameters reveals what appear to be delta constituents arising from the presence of tin. This element is known to cause brittleness and reduce ductility.

sleeve with a diametrical clearance on 0.0012 in. between the two. The weight of the bushing and its mounting was 91 lb. and an additional load of 400 lb. was added making a total load of 491 lb.

Undue wear was indicated by fluctuations of the driving power from relatively low values to high values, measured by an ammeter. In all cases, the brasses ran quite

well and gave no indication of seizing. They also ran well with lead-free bronzes. Bronzes containing 2 per cent or more of lead will run free under similar conditions. Bronzes which do not contain lead will seize, as is the case with brases.

The addition of tin to the alloys appears to aid the casting properties. The metals appear to run more

readily than without tin and to have a better finish. Tin adversely affects the ductility of the metal as measured by elongation but slightly improves the corrosion resistance.

In Arnott's examination, a sound section was taken from the rim of the type B casting he had made and was submitted to a testing laboratory for mechanical property tests. A tensile test piece, 0.505 in. in diameter with a 2-in. gage length was prepared and gave the following results:

Limit of proportionality, lb. per sq. in.	10,080
0.1 per cent proof stress, lb. per sq. in.	15,680
Yield point, 0.5 per cent elongation under load, lb. per sq. in.	19,700
Ultimate stress, lb. per sq. in.	33,600
Elongation, percent on 2 in.	9.0
Brinell hardness (10-1,000-15)	90.0

Fig. 6 illustrates the structure of the section at 500 diameters after etching. This is of particular interest as it shows what is apparently the delta constituent arising through the presence of tin. This constituent promotes brittleness and it is interesting to note that in this case a tin content of 1.2 per cent has reduced ductility, as indicated by elongation, to 9.0 per cent.

It might, therefore, be assumed that when the copper content in type B brass is on the low side of the compositional range, a tin content of 1.0 per cent should not be exceeded. Otherwise, some difficulty may be experienced in meeting specifications as far as elongation is concerned.

**TABLE VIII**

Results Obtained From Scrap Metal Charges

Cast No.	Cu, Per Cent	Sn, Per Cent	Pb, Per Cent	Zn, Per Cent	Fe, Per Cent	Ni, Per Cent	Al, Per Cent
A.1	73.41	0.05	2.50	23.83	0.11	0.10	Nil
A.2	70.69	0.12	3.39	25.42	0.08	Nil	Nil
A.3	74.20	0.55	2.80	23.02	0.09	0.14	Nil
A.4	72.90	0.31	2.90	23.56	0.27	0.06	Nil
B.1	66.21	0.24	3.07	30.35	0.08	Nil	0.05
B.2	63.41	0.61	2.89	32.80	0.18	0.11	Nil
B.3	64.71	0.36	2.12	32.40	0.26	0.10	0.05
B.4	64.11	0.87	2.95	31.96	0.11	Nil	Nil

**TABLE IX**  
Physical Tests

Cast No.	Ultimate Stress, Lb. Per Sq. In.	Elongation, Per Cent on 2 In.	Brinell Hardness
A.1	35,600	32	47
A.2	33,800	30	49
A.3	31,800	21	56
A.4	30,900	24	53
B.1	32,000	41	50
B.2	35,800	27	57
B.3	33,800	32	53
B.4	32,000	16	62

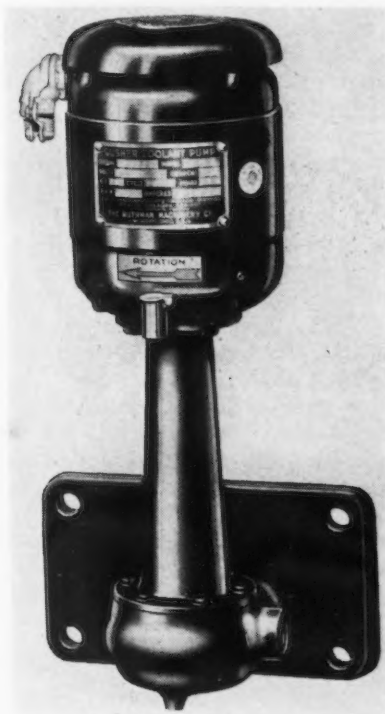
# New Equipment . . .

## Small Tools & Gages

New developments in pumps, cutting oils, and small tools and accessories are described herein.

### New Gusher Pump

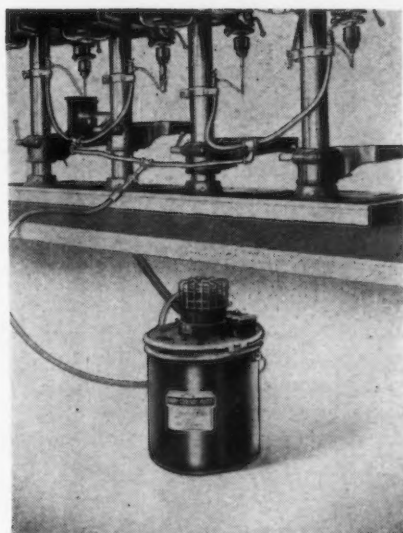
**A** NEW model 5-P3 vertical 1/10-hp. motor driven Gusher coolant pump has been developed by the *Ruthman Machinery Co.*, 1819 Reading Road, Cincinnati. The discharge relation is available either right hand or left hand. Capacity of the pump through 1/2 in. pipe at 5-ft. head is 10 gal. per min. Impeller housing and mounting flange are cast in one



piece. The driving motor is a full ball bearing type with one-piece suspended shaft to the pump housing. Packing and metal contacts are eliminated.

### Portable Coolant Pumps

**A** LINE of portable coolant pumps, which can be quickly and easily attached to used and new machine tools is announced by *Gray-Mills Co.*, 213 W. Ontario St., Chicago. The pumps have replace-



able gears and the coolant flow can be adjusted from a small stream to a heavy flow by means of a wing nut on the coolant tank. Fittings are available for attaching to various types of machines, including multiple spindle drill presses. The coolant is pumped from a small tank to the work and is permitted to drain back into the tank, through a strainer, for settling and recirculation. Pumps are available in capacities from 50 to 165 gal. per hr. Heavy-duty units are equipped with forced settling baffle plates which is said to make them especially adaptable to use with abrasive grinding, milling and honing machines. A larger capacity model designated as G-10A is also supplied by Gray-Mills. This model uses a centrifugal pump which comes in capacities from 10 to 1000 gal. per hr. Tank capacity is 40 gal.

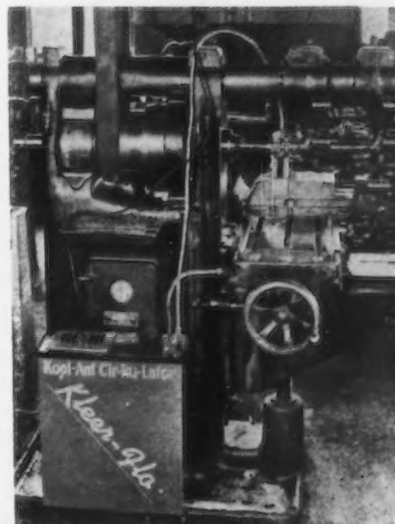
### Coolants

**A** NEW line of Flo-Bac coolants has been announced by *Gray-Mills Co.*, Chicago. The new lines include a soluble cutting and grinding oil for use where both cooling and lubricating are desired; a high test sulphurized cutting oil contain-

ing a high percentage of active sulphur which avoids gumming and is free from objectionable odor; a transparent sulphurized cutting and drawing oil for general metal cutting and drawing where it is desired to see the work through the oil; and a mineral-lard blend cutting oil recommended for cutting non-ferrous metals.

### Coolant Circular

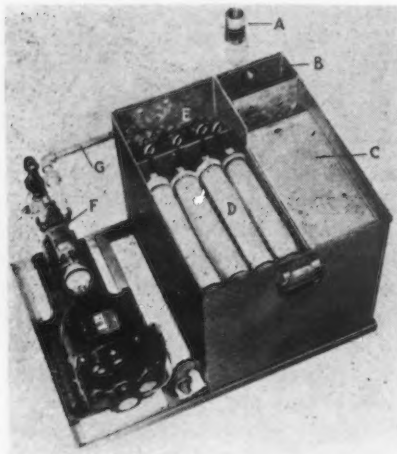
**A** PORTABLE machine tool coolant circulator with a capacity of 75 gal. per hr. of a cutting oil of SAE 10 or lighter is being marketed by the *Practical Products Co.*, 1629 University Avenue, St. Paul. This unit, called the Klee-Flo Kool-Ant Cir-Ku-Lator, fits any standard machine tool requiring wet cutting or wet grinding. The cabinet has a capacity of 8 gal. The centrifugal pump has an open impeller to prevent jamming by chips, grit, etc., and operates on 110 or 220 volt, 60 cycle a.c. The filter consists of two perforated steel cones with a layer of white cotton waste between them. Flow of the coolant is easily controlled to provide the desired amount of coolant.





### Oil Filter

**T**HE new Klenzstream filter, made by *Schurs Oil Burner Co.*, 4216 Long Beach Avenue, Los Angeles, is designed not only to remove chips and coarse dirt but also fine abrasive particles and gummy



oxidized elements from cutting oil or coolant. The used and dirty oil flows from the drip pan of the machine into a series of removable trays into which the heavy chips settle out of the oil. From here the cooled oil flows through special fabric-covered filter units which remove practically every trace of foreign matter; thence through a system of outlet valves into a clean oil reservoir from which it is withdrawn for re-use through a floating suction element by a circulating pump. The pump can be operated on the machine or separately.

### Cutting Oils for Aluminum

**A**SPECIAL soluble cutting coolant for aluminum sand castings, zinc and aluminum die castings, and soft metal alloys is Quaker A. M. Base, a product of *Quaker Chemical Products Co.*, Conshohocken, Pa. It instantly emulsifies in cold water and is used in proportions ranging from 6 to 30 parts of water. This keeps the applied cost low while providing high cooling power. The wetting and spreading action on aluminum is good and it has necessary lubricity to provide a fine finish. A related product, Quaker A. M. Base No. 11, is a concentrated base which, when mixed with kerosene or medium petroleum oil provides an excellent coolant and lubricant for difficult machining jobs on aluminum, particularly the silicon alloys. This product is said to give exceptional finish. Its lubricity and EP values

are not diminished by dilution with light petroleum oil such as mineral seal oil used to achieve maximum wetting and cooling properties.

### Cutting Oils

**D**EVELOPMENT of a new line of cutting oils is announced by *Standard Oil Co. of Indiana*. The new cutting oils permit faster speeds, closer tolerances in sizes and finishes, and increased use of alloy steels which have lower machinability ratings than the metals commonly encountered, according to Standard chemists.

### Coolant Strainer

**T**O meet the demand for 24-hr. operation, the Metex coolant strainer, made by *Metal Textile Co.*, Orange, N. J., is now manufactured in three sizes, for use on turret lathes, screw machines, milling, drilling and other metal cutting machinery using a coolant flow. Model B is especially designed for shallow sump tanks on milling and small automatic screw machines, and has a capacity up to 5 gal. per min. Model



C, adaptable to most machines, has a capacity up to 10 gal. per min. It is especially suitable for deep, narrow sump tanks. This strainer strains all metal cuttings and chips that remain in suspension. Coolant passes through multiple layers of interstitial knitted and crimped mesh.

### Lathe Center Lubricant

**A**LUBRICANT for the dead centers of lathes has been developed by *Joseph Dixon Crucible Co.*, Jersey City. The product is a combination of pure flake lubricating graphite and other specially formulated ingredients made to withstand the high pressures and temperatures developed at the dead center in lathe work. Tests on all types of lathes have demonstrated that this lubricant effectively controls over-

heating and protects dead centers against scoring and softening, reducing wear of the dead center and also reducing spoilage of work. This new Dixon product also has many uses as an anti-seize compound where a lubricant of extreme film strength is required. It is being sold in 1, 4 and 8 oz. collapsible tubes.

### Cutting Compound

**W**AYNE CHEMICAL PRODUCTS CO., Detroit, announces its Nosep lubricant for difficult threading, hobbing, tapping, drilling, broaching, blanking, piercing, reaming and other cutting operations on steel. It is also suitable for many drawing operations. This new compound is said to have great lubricating value, absorbs the heat or friction and glazes the tools, giving longer life. To accomplish these results, finely divided particles of sulphur and other pigments which act as non-welding agents between the tools and the parts have been incorporated into the compound. The pigments are treated so that they do not settle or clog the lines of circulating systems.

### Arc Etching Machine

**A** NEW all-purpose production etching machine, which deeply etches hardened parts without burr in minimum time has been announced by the *George Gorton Machine Co.*, Racine, Wis. In this unit, a wire electrode is oscillated magnetically 120 times per sec. Each time the electrode touches and leaves the workpiece, a high amperage electric circuit is made and broken, creating an extremely hot arc. Simultaneously, the electrode is moved by pantograph over the work, causing a steady succession of overlapping tiny craters which



form the etching. The "Spit-Fire," as this unit is called, is capable of light or deep etching on flat or irregular surfaces, on concave or convex curvatures. Etching depth is variable by one dial control from 0.001 to 0.003 in. deep. Etching width is variable by diameter of electrode used from 0.0075 to 0.015 in. Characters can be varied in height from 1/32 in. to larger sizes. Operating on 110-120 volts, 60 cycles a.c. only, etching voltage is stepped down, and is variable from 3 to 9 volts.

#### Pipe Bending Machine

**TAL'S PRESTAL BENDER, INC.**, Milwaukee, announces a new pipe bending machine which produces smooth, even bends up to



180 deg. on iron and steel bar and pipe without any kinks or wrinkles, in a single, simple operation without moving the pipe. The forming heads are moved forward toward the pipe by the hydraulic piston of this machine, operated by a pump handle at the rear of the assembly. This machine is 32 in. long, and weighs 98 lb. with the largest forming head. In addition to pipe bending, the unit can be applied to pressing and pushing work.

#### Control Station Switch

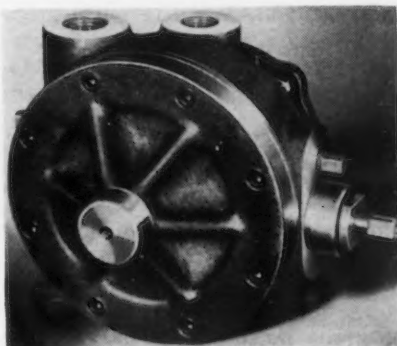
A **STATION** control switch universal enough to meet the voltages and amperages of practically all heavy duty service requirements has been announced by the



**National Acme Co.**, 170 E. 131st Street, Cleveland. Snap make and break of contacts and positive locking in either position are safeguarded by spring pressure and hardened steel cadmium coated parts. The push mechanism is closely fitted in housing, with 1/16 in. cushioning overtravel. Standard assemblies consist of three, two or one-button combinations furnished either in flush type for mounting in standard cavity or box type for surface or pendant mounting. All parts are interchangeable.

#### Shock-Proof Oil Feed Pump

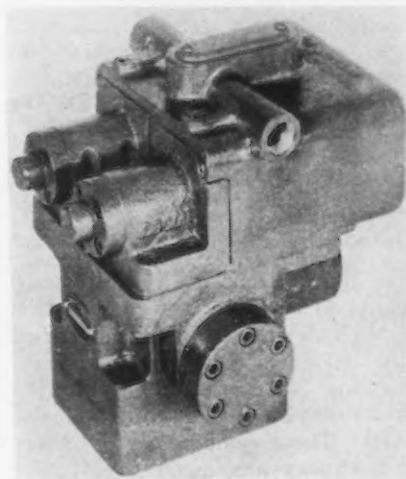
**H**EAVER section reinforcing webs, conical instead of flat cover plate for increased resistance to shock, and mounting bracket of a type that is considered standard by most manufacturers of hydraulic pumps, are features of the re-designed Hydra-motive vane-type variable delivery pump made by **Hydra-Motive, Inc.**, 253 St. Aubin Avenue, Detroit. Delivery is variable from 0 to 4 gal. per min. and operating pressures are 1000 lb. per sq. in. with a top "short-interval maximum" of 3500 lb. per sq. in. To permit maximum selection of adjustment, a split stator is employed. Adjustment and limit screws on the outside of the housing allow for



varying the delivery to any amount required within the operating range.

#### Four-Way Valve

**A**N improved four-way valve, offered by **Hydraulic Hi-Speed Co.**, 5438 Tireman Avenue, Detroit, features either closed or open center operation by a slight mechanical adjustment. Used on a machine tool, a production oven, or wherever spring centered, four-way valve operation is desired, it permits a change to a different type of operation without replacing the valve. The valve is available in three models, of 10, 18 or 28 gal. per min. capacity, with a maximum recommended working pressure of 2000 lb. per sq. in. Valve is furnished complete with sub-plate and solenoids in a choice of voltage and cur-



rent characteristics. The main valve spool is operated hydraulically by pilot valves. These in turn are activated by the solenoids to produce a full range of four-way valve operation.

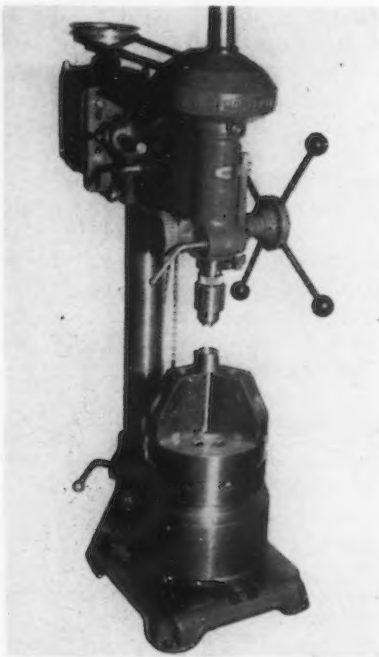
#### Speed Nuts for Plywood

**T**HE new speed nut for plywood, made by **Tinnerman Products, Inc.**, 2040 Fulton Road, Cleveland, is reported to be the only self-locking nut which can be instantly driven into anchored position. It is designed with two pair of integrally formed attaching legs. When driven into thick plywood the cam-like structure of the legs forces them outward permanently holding the nuts with firm spring-tension grip in the wood. These new speed nuts are made for use on both Air Corps 530-8 and 530-10 screws which are the standard type "Z" sheet metal screws.



### Air Cylinders and Chucking Devices

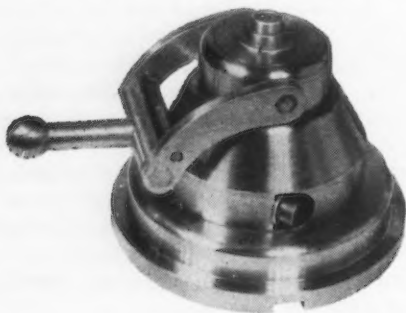
**D**RILL presses, as well as lathes and vertical milling machines can be quickly made into production machines by the use of air cylinders and air operated chucking devices made by *Anker-Holth Mfg. Co.*, Chicago. Shown in



the illustration is a drill press equipped with the new combination air cylinder and air operated, three-jaw universal chuck used for performing all internal machining operations on 40 mm. high-explosive shell. These combination cylinders and chucks are made in cylinder sizes from 6 to 15 in., for air pressure up to 100 lb. Total jaw travel for the 6, 8, 10 and 12 in. sizes is  $\frac{3}{4}$  in., and 1 in. for the 15 in. size. Jaw pressures range up to 75,000 lb. The chuck will grip either internally or externally. Operation is either by foot or hand valve.

### Collet Chucking Fixtures

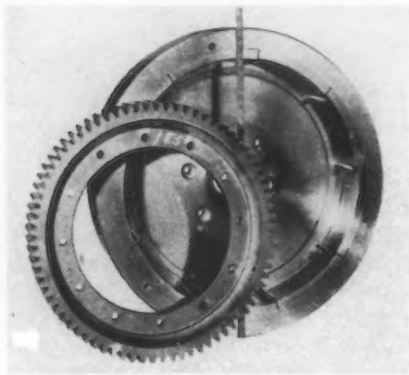
**A**N indexing type of collet fixture for use in milling squares, hexagons, slots and keyways is being offered by *Zagar Tool, Inc.*,



23880 Lakeland Boulevard, Cleveland. Collets and index plates are quickly interchangeable to take up to 1 and 2-in. diameter parts with divisions up to 25. One handle is used for closing and indexing the collet. A lock is provided for heavy cuts or when the index fixture is used for holding only, as in drilling and tapping operations. Cutting oil can be introduced under pressure to flush chips out of the collet. The holding fixture can be fastened to the faceplate of a lathe for second operation work.

### Gear Chuck

**T**HE Cotta Speed-Chuck, developed by *Charles Cotta*, 1712 Harlem Avenue, Rockford, Ill., is a practical solution to the problem of holding spur or helical gears for hub, hole, or face grinding and other comparable operations. The gear is set into the chuck where a slight turn causes it to be gripped firmly by a set of hardened and ground pitch-line pins. These pins bear against a set of ground eccentric cams which are placed to tighten against the normal direction of rotation. The gear is re-



leased by a slight turn in the opposite direction. Various types are available for single or cluster gears and sizes range from 3 to 36 in. diameter.

### Temporary Sheet Metal Fastener

**N**EW developments for aircraft skin assembly recently introduced by Prestole Division, *Detroit Harvester Co.*, Toledo, Ohio, include Prestite nut plate fasteners and the Prestite Safety Champ gun. The nut plate fasteners are used for holding nut plates temporarily while they are being riveted to aircraft sheets. A shoulder in the fastener automatically locates the nut concentric with the clearance hole in the sheet. This feature permits the holes in the base of the

nut plate to be used as a template for drilling the rivet holes in the sheet if desired. The Prestite Safety Champ gun, illustrated, is used for assembling the Prestite skin holders to aircraft sheets. A



unique feature is the use of steel hardened replaceable clips in the muzzle, providing for greater safety as the clips may be easily replaced if they show any signs of wear.

### Comparator Gage

**T**RICO PRODUCTS CORP., Buffalo, announces a new type of gage, accurate to within less than 0.0001 in. The red-tipped indicator finger multiplies by as much as 200 the movement of the gage contact point. Tolerance limits are set from master parts and the gaging indicator moves between these adjustable points. The Micro-chek, as this gage is called, is operated with the gaging plunger slightly retracted. When the button is pressed, the plunger is released for contact with the piece to be inspected. In snap-gaging operations, the button control is made non-operative by turning down a set screw. Two Micro-cheks may be hooked up in dual fashion so that two dimensions may be checked simultaneously.

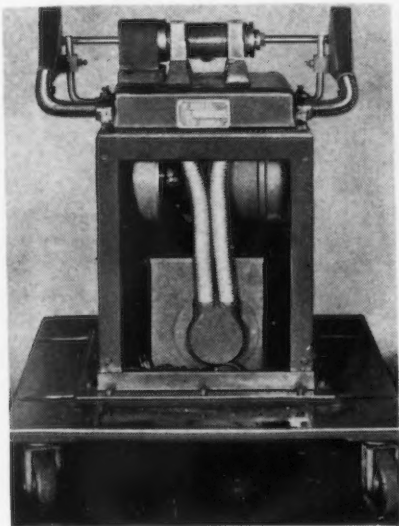




## NEW EQUIPMENT

### Dust Collecting System

**D**USTKOP, manufactured by *Aget-Detroit Mfg. Co.*, Book Tower, Detroit, is a self-contained



dust collecting system for use with portable grinders. This unit pulls the dust-laden air away from the grinding wheels through the flexible metal hose and into the unit itself. There it is, sent through a horizontally placed spun glass filter which stops the dust and lets it fall, permitting the clean air to re-circulate into the room. This pan is readily removable for emptying. To secure maximum efficiency the intake hoods of the grinder units are supported so that they can be moved up or down as operating requirements indicate.



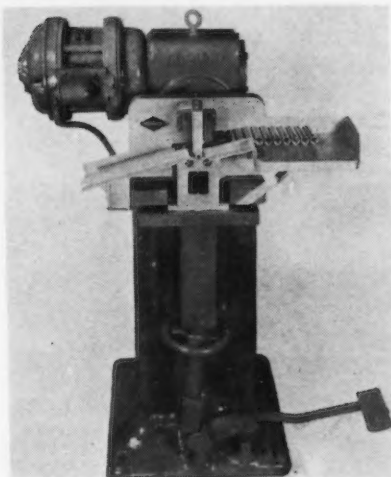
### Metal Etcher

**T**HE IDEAL COMMUTATOR DRESSER CO., 1925 Park Avenue, Sycamore, Ill., announces a new electric etcher that permanently marks steel, iron or their alloys. "Hi-Lo" taps and a seven point switch give 14 etching heats between 115 to 1300 watts. Depth of

mark can be controlled by speed of writing. The tool has special heat radiating fins and an alloy tip point. Secondary cables have asbestos covering, work plate is 4 x 7 in. with ground clamp attachment.

### Knurling Machine

**W**ILLIAM A. FORCE & CO., INC., Brooklyn, announce a new knurling machine which is semi-automatic with a production rate of 1000 pieces and over per hour. Work pieces are fed by hand. The action of the foot treadle brings the work to the knurling roll and then ejects upon retraction. Units may be assembled for knurling cylindrical pieces ranging in diameter from  $\frac{1}{4}$  to 3 in.



### Shell Nose Marking Machine

**A** NEW hand operated marking machine that will do 650 or more shell noses per hour is offered by the *Acromark Corp.*, 9-13 Morrell Street, Elizabeth, N. J. This machine is designated as the Acromark No. 926. Through reduction gearing and a gear and rack arrangement the hand lever rotates the part to be marked in step with the straight line interchangeable type holder. The type holder is placed at an angle on the slide with



adjustable gibs, and in operation a smooth slide movement rolls the straight line characters into the tapered part. One or two lines can be marked without distortion of the mark and without undue effort on the part of the operator. Mandrels can be interchangeable for different sizes of parts, and a double screw arrangement at the back of the type holder slides it forward or backward for marking depth.

### Marble Surface Plates

**S**URFACE plates for use in checking and layout work are now being furnished in standard sizes made out of Tennessee marble by the *Standard Marble Works, Inc.*, 242 Java Street, Brooklyn. The surface plates are flat within a high degree of accuracy and are highly polished. The standard 12 x 18 in. plate is about 4 in. thick and has two hand grips milled at each end. They are designed to replace cast iron surface plates and draw upon an industry that heretofore has not entered the war effort.

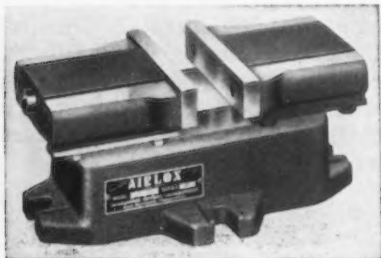
### Angle-Set Vise

**T**HE Universal 3-way vise, made by *Universal Vise & Tool Co.*, Parma, Mich., holds work rigidly for operations involving either single or compound angles. Ease of setting any complex angle and interchangeability of jaw plates makes the device suitable for short or reproduction runs. It is fully



portable, two large lugs on the base provide easy rigid bolting. The double swivel cradles (each allowing 90 deg. adjustment) over a full swiveling base (allowing 360 deg.

rotation) provide three separate motions, individually adjustable and lockable. The wedge locks are 2000 lb. torque tested. Jaw opening is 5 in.



Junior Pneumatic Vise

**PRODUCTION DEVICES, INC.**, Poultney, Vt., announce the new Airlox Junior Colt type vise, a precision built production tool powered by a Schrader air cylinder, and so constructed that the cylinder and mechanism are enclosed inside the vise body. Since the work is done over the approximate center of the vise table, this vise insures even distribution of weight on the milling machine table whether it is fastened across or lengthwise on the table. Machine surfaces on top of the vise jaws permit attachment of any special fixtures. Screw adjustment of the stationary jaw enables the operator to set the jaw opening so as to grip the work during the last 1/16 in. of jaw travel. Maximum gripping pressure is 20 times air line pressure. Bolts can be adjusted to lock the jaw firmly in place.

Lathe Tool Holder

A SIMPLE and rugged engine lathe tool holder has been developed by the *Lane-Wells Co.*, Los



Angeles. Known as the Lane-Wells universal tool holder, the device consists of a tool post which can be fitted onto any engine lathe carriage compound rest. Into cylindrical members fit the detachable heads. Standard high speed tool bits used for boring, turning, threading, facing or forming are fastened into the heads; drills and reamers can also be used. When the operation on the stock is performed by one tool, the operator releases the head and replaces it with another one. After sizes are once established, all readings can be taken from the cross feed dials. Four sizes of the device fit all standard makes of engine lathes from 10 to 24 in. swing.

Hydraulic Vise

**STUDEBAKER MACHINE CO.**, 9 S. Clinton Street, Chicago, announces a new Drillvise for holding work on the table of all types of drill presses, planers, shapers, milling machines, surface grinders,

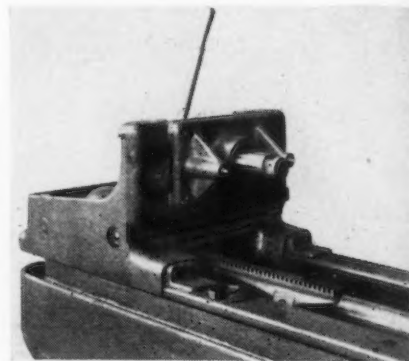


lathes, cut-off saws and other machines. This new tool is foot controlled and hydraulically operated, permitting use of both hands in the operation, set-up and removal of work from the machine on which it is mounted. Work is placed between the open jaws of the vise and is clamped by the operator depressing the middle pedal of the foot control. The right or booster pedal moves the jaw a maximum of 3/16 in. for each downward stroke of the foot and exerts a maximum pressure of 10,000 lb. per sq. in. To release

work held between the jaws, the left pedal is depressed.

Fixture for Threading Machine

**LANDIS MACHINE CO.**, Waynesboro, Pa., has recently developed a special work holding fixture for use with their



Landmaco machine for threading vital components required in the munitions industries. The fixture provides a work aligning arbor on which the work is retained by a collar which fits a square, milled close to the end of the arbor. A lever operated cam arrangement at the rear end of the arbor provides a means for drawing and locking the work piece onto two driving and locating pins. The fixture is fastened to a faceplate which bolts to the machine carriage in place of the conventional carriage front or vise. It has both horizontal and vertical adjustment to assure accurate and permanent alinement of the work piece with the center of rotation of the threading unit.

Precision Lapping Plate

A N improved lapping plate has been announced by the *American Gauge Co.*, 128 Bayard Street, Dayton, Ohio. It is 8 in. wide by 12 1/2 in. long and 2 1/2 in. high. The cast iron block is of especially fine grain, about 1 1/8 in. thick, mounted on four legs. The surface is cut with 1/16 in. grooves in a diamond pattern, the grooves being spaced 1/4 in. and at right angles to each other, but 45 deg. to the length and breadth of the plate.







## Mrs. Parker's cooking utensils are making it hot for the Japs

Thanks to the kind of planning that wins wars, the finest of everything goes to the fighting forces. So thousands of women whose hearts were set on outfitting their kitchens with Revere Copper-Clad Stainless Steel utensils are now treasuring the pieces they were fortunate enough to get before the war.

Treasuring them but using them—hard. For the same fine materials and manufacturing techniques that are making our military machine so tough have fortified Revere Ware utensils against years of the severe usage enforced by war.

The Revere plant where these "Kitchen Jewels" were made was

able to change over smoothly and quickly to implements of war. Like all other manufacturing plants, it could rely on the Revere Technical Advisory staff for skilled help in methods of processing the unfamiliar copper alloys of wartime.

Every ounce of copper our country produces goes directly into the essentials of warfare. Fortunately, Revere is well equipped, with modern plants, improved machines, and advanced techniques to assume a heavy responsibility in the production of vital copper alloys. And Revere research is continually probing deeper into the secrets of copper to help develop still better, stouter arms for victory.



The Revere Technical Advisory Service functions in (1) developing new and better Revere materials to meet active or anticipated demands; (2) supplying specific and detailed knowledge of the properties of engineering and construction materials; (3) continuously observing developments of science and engineering for their utilization in production methods and equipment; (4) helping industrial executives make use of data thus developed. This service is available to you, free.

## REVERE COPPER AND BRASS INCORPORATED

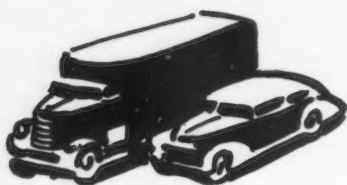
*Founded by Paul Revere in 1801*

EXECUTIVE OFFICES: 230 PARK AVENUE, NEW YORK



# Assembly Line . . .

• Car dealers worried over dwindling supply of mechanics wooed by war and arms plants . . . Older cars leaving road while stock of new cars lessens . . . Solventol seeks lists of old spray washers.



**D**ETROIT — Increasing scarcity of automotive mechanics appears to be progressing to the point where the problem merits immediate and active consideration if the nation's automotive transportation facilities are to be kept in running order.

A survey by the National Automobile Dealers Association indicates a loss of nearly 50 per cent in auto mechanics in important cities since the start of 1942. The survey covered 274 metropolitan establishments whose mechanic employees had diminished from 3,466 to 1,846 during the past year—a loss of 47.7 per cent. The actual number leaving during 1942 was 2350, representing a turnover of 67.8 per cent, compensated only partially by hiring of 730 new men.

The generally more lucrative opportunities in war plants was the prime reason for this turnover. Of the 2350 men who left, 1246 of them went into armament factories. The draft absorbed 566 of the men.

This is the metropolitan situation; the rural picture is fairly parallel. From the Arkansas Automobile Dealers Association came word that during the past 17 months the number of mechanics at work in dealerships had fallen 39.9 per cent, from 1907 to 1145. The 193 dealers reporting estimated that they, as a group, needed 500 more mechanics in their service departments to fulfill minimum re-

quirements. And of the 1145 men still at work at tabulation time, 364 were classified 1-A in the draft, indicating more employer headaches ahead.

Similar word came from the Atlanta branch of Ford Motor Co., covering a large number of southeastern dealerships. This report showed 547 mechanics employed on Nov. 1 against 942 a year earlier. Of the 547 at work last month, 469 had been newly hired since May.

**I**T is open to debate whether the need for more repairs, due to older average life of cars on the road today, overbalances the easing of the maintenance picture due to cars going off the road. It is increasingly apparent, however, that the movement of cars from use is accelerating, and will undoubtedly be further speeded by the December extension of gasoline rationing throughout the country.

The dealers' association figures that at least 1,500,000 passenger cars went off the road in the 12 months ended last Oct. 1, based on registration reports from 34 states. These reports point to a national registration reduction of 1,237,000 passenger cars, to which must be added the number which have been retired through age, accidents or tire disintegration since registration.

Also, it is estimated by this same agency that some 200,000 trucks have left the highway in the 12 months which ended in October.

Significant is the fact that the association had estimated as of July 1 that 1,000,000 passenger cars had gone into disuse. The figures demonstrate, then, that 500,000 cars went out of service in the three months since then—quite a notable proportionate increase from the 1,000,000 of nine months previous.

From the Treasury Department comes confirmation of the dwindling size of the nation's stockpile of active cars and trucks. The figures show that 28,583,551 motor vehicles carry use tax stamps today. This compares with 34,383,167 units registered last year, leaving 5,799,616 vehicles without stamps today.

Undoubtedly a substantial number of these are tax evaders, but it would be probably be reasonable to hypothesize that from one-third to

one-half of the stampless vehicles are off the road today.

**T**HE reduction of the national stockpile of new cars, meanwhile, continues unabated. Ration sales of cars are currently being given a boost by the 13 Army Ordnance Districts which are purchasing 29,000 new Chevrolets, Fords and Plymouths, probably close to 20 per cent of all cars remaining in dealer hands.

This big buy calls attention to the fact that dealers are clearing out low-priced cars fairly well, but are having much less success disposing of big jobs. To meet this problem, a drive is under way among automobile dealer groups to eliminate from rationing requirements approximately 2000 dealer-held new cars selling at \$2,500 or more.

Slow movement of this \$5,000,000 stock is attributed to the fact that most purchasers in the luxury brackets had ample transportation when rationing began last January, and therefore cannot show need for new cars.

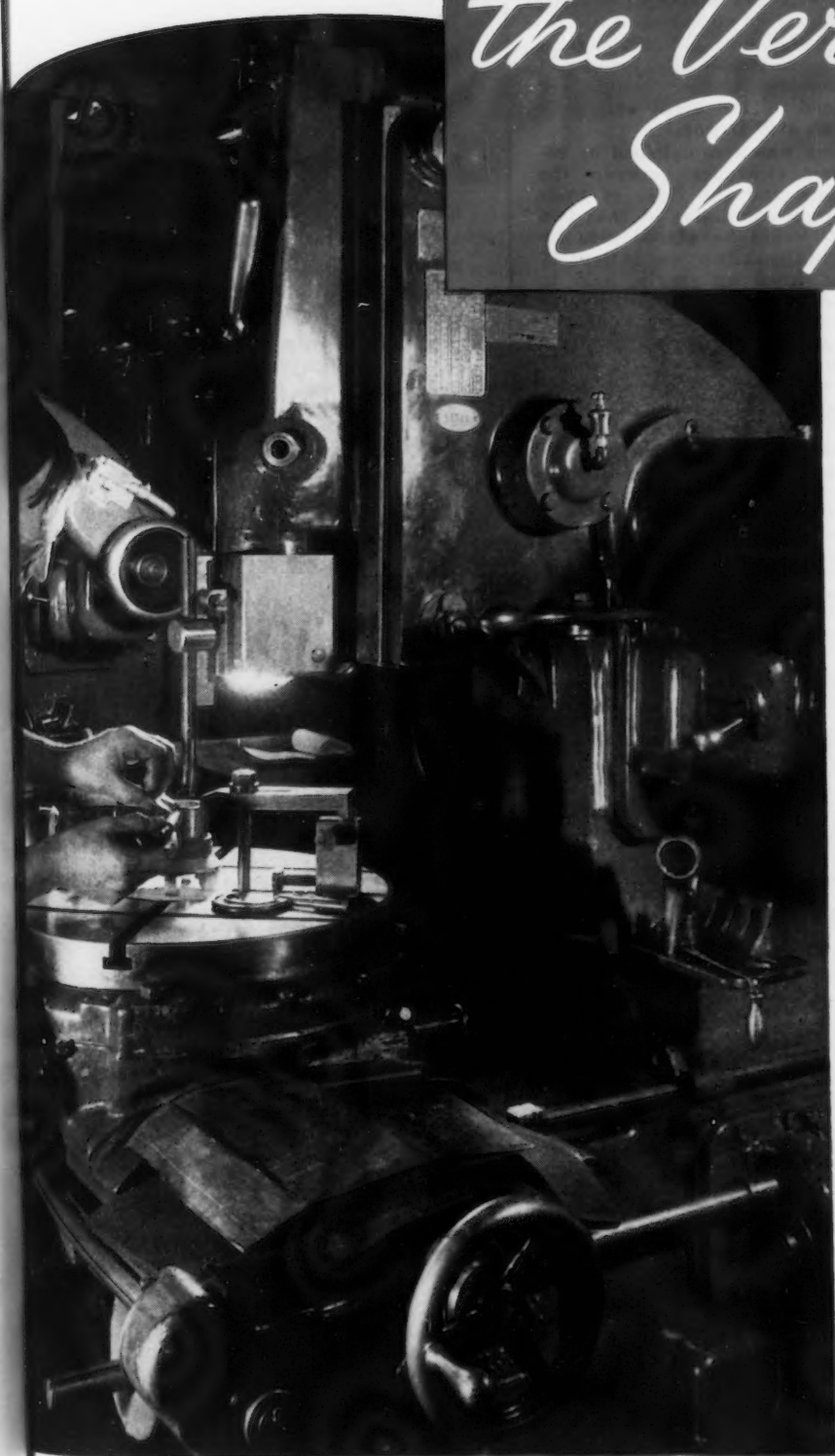
The dealers argue that release of these luxury cars from rationing would not precipitate a hasty rush to obtain them, inasmuch as gasoline rationing considerations, coupled with the low mileage per gallon expectancy of the heavy cars, would serve to deter many purchasers.

This car pool includes large Buicks, certain Cadillac series, Chrysler Imperials, Lincoln Continental models, and Packard Super Eights. More than half of them are said to be convertibles, a class of vehicle particularly slow in moving during 1942. Nearly all of the cars are in metropolitan areas, and a committee of dealers is urging the OPA—apparently with fairly bright prospects—to liberalize the ration requirements on this particular group.

Incidentally, while car merchandising is the subject, note should be taken of moves leading toward price ceilings on used trucks, trailers and semi-trailers. OPA held a Cleveland meeting on this subject late in November, attended by manufacturers, dealer representatives and others. After the meeting one of the participants indicated belief that price ceilings on these commercial vehicles might be

"The handiest machine in the shop . . ."

## *the Vertical Shaper.*



**H**ERE'S a machine that's the pride and joy of any good machinist who has it available. For it has an almost-human *adaptability*. It handles a vast variety of irregular shapes with a rock-bottom minimum of set-up changes. No mere slotter, it combines simple flexibility of work-holding and adjustment with refinements of non-overhanging tool head and extremely smooth ram motion.

For this is the P&W Vertical Shaper — one of many Pratt & Whitney products that provide *basic accuracy for mass production*. In tooling, it finishes complex box jigs and other high-precision fixtures. In die-making its angular ram adjustment is a welcome extra feature that permits direct machining of reliefs. It's ideal for repair work, and for small-lot production. The P&W Vertical Shaper makes tough jobs simple; its owners report they find new uses for it every day.

If you need basic accuracy for mass production, call on Pratt & Whitney. There is no better-paying investment than the right tools for each job. Details of the P&W Vertical Shaper will be supplied on request.



**PRATT & WHITNEY**

*Division Niles-Bement-Pond Company*

**WEST HARTFORD • CONNECTICUT**



established before this month is out.

**T**RUCK selling brings up the laudable job being done by Studebaker Corp. with its "transportation placement plan," designed to link truck sellers and buyers throughout the wide areas of the country.

Studebaker dealers are tabulating idle or only intermittently used units, or units classified as being in non-essential use and available for full time essential transportation. At the same time, data is obtained on truck users who need or will need additional equipment, and on truck users who want or will want to dispose of trucks.

One copy of the records is filed on cards in the dealership. Duplicate copies of the cards are kept in regional offices of the company, so that if an availability and a demand match each other anywhere in the region, the central office puts the parties in touch with each other through the dealerships. The program, announced by R. G. Hudson, manager of Studebaker's truck division, is regarded as a long range affair because non-essential users will continue to withdraw vehicles from service more rapidly as time goes on, and the needs of essential users will continue to amplify.

War plants should be interested in a program of Solventol Chemical Products, Inc., designed to utilize old spray washers which are today being only partially used or are standing idle.

Solventol's president, C. A. Campbell, pointed out that many old spray washers can easily be modernized. At the very least, he said, pumps, motors and conveyors could be put into active service.

To accomplish this end, Solventol has designated J. R. Ewing to receive reports of available washer equipment and to distribute them in bulletin form each week to all other manufacturers of spray washing machines. These bulletins will also be made available to all war plants requiring additional equipment.

"It would help," said the company, "to know where two and three stage washers are being used on a one stage basis only. In many such cases the unused stages could be made into separate units for use in other plants." The idea is pat-

### More Plane Motors Loaded per Car

• • • A new means of packing employed by an automotive company producing aircraft engines has made possible the loading of 18 motors to every freight car instead of the eight originally put on a 40 ft. car.

This was accomplished by reducing clearance between the engines and the sides of their shipping containers so that two boxes could be placed side by side in the railway car instead of being lined up singly, held in place with dunnage. At the same time, the reduced length of each box permitted two rows of nine engines each, instead of a single row of eight.

In the process, shipping cost was reduced from \$67.50 per engine to \$50.38 per engine, the amount of steel strap used to hold the load was reduced from 428 ft. to 330 ft., and the large amount of board used for dunnage was also eliminated.

tered after the Lloyd machine tool panels set up in ten of the thirteen ordnance districts to make better use of the available machine tools in war industry.

Mr. Campbell stated that even though high priority for sheet steel, motors, pumps, conveyors, etc. are being granted to manufacturers of metal cleaning equipment, the industry could cut down requirements for those critical materials if this drive proves successful.

MICHIGAN MANUFACTURING PAYROLL  
STATISTICS  
Oct., 1942  
(Preliminary)

	No. of Plants Reporting	Average Weekly Hours	Average Weekly Earnings	Average Hourly Earnings
Transportation machinery and equipment . . . .	147	45.7	\$55.32	\$1.212
Machinery, non- transportation . .	185	48.0	52.33	1.086
Iron, steel and their products, other than ma- chinery . . . . .	122	45.1	49.61	1.097
Non-ferrous met- als and their products . . . . .	53	46.4	52.15	1.126
Forest products . .	91	42.2	30.22	.718
Stone, clay and glass products . .	34	44.5	41.09	.922
All durable goods	632	45.7	52.50	1.146

### British Plane Plants Learn Lessons from Combat

• • • Lessons learned in combat are translated immediately into changed airplane design in England, T. P. Wright, chairman of the United States Aircraft Production Mission to England, states in a report on his observations. Mr. Wright is deputy director of the aircraft division of WPB.

Mr. Wright was impressed with advanced aircraft engineering developments in England. He emphasized the need for "courage in projecting ahead the types of development which may contribute toward winning the war a year or two hence." Of the fighter planes now in production, he praised the Spitfire with its latest Merlin engine, and the Mosquito. He spoke highly of the Lancaster bombers.

Mr. Wright said that output in terms of man-hours is somewhat less than in the United States. A factor limiting British production in terms of manpower is the relative obsolescence of British equipment as compared with our own.

On the other hand, the working day of aircraft labor is about 15 per cent higher than in the United States, and "it is possible that the intensity of labor effort is somewhat greater," Mr. Wright said.

### American Bridge at New Production Peak

Chicago

• • • Production for the first 10 months of this year at the Gary plant of American Bridge Co. exceeded that of any like period since the plant was put into operation in 1911.

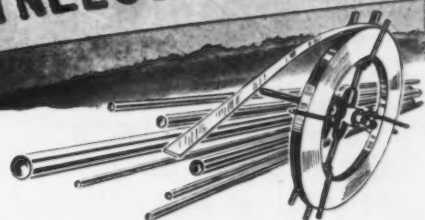
This all-time record represents an average monthly output at the full rated capacity of the plant, with a maximum peak of 111 per cent reached during the month of July.

### APS Protected Steel Sheets

In the Dec. 3 issue of THE IRON AGE, the advertisement for Protected Steel Products Co., Pittsburgh, appeared with the words "National Distributors for APS" underneath the firm name. This is in error as this company is the manufacturer of APS Protected Steel Sheets. Distributors are located throughout the country in important production areas.



# 8 WAYS TO GET MORE PRODUCTION... FROM EVERY POUND OF STAINLESS STEEL



Getting increased output from every pound of Stainless Steel is more than an answer to your own production problem. It is also a measure by which the success of our war effort will be determined.

Part of Carpenter's job during total war is to help you get more perfect parts and fewer rejects from the Stainless Steel you use. In many plants like yours, Carpenter service representatives are helping to overcome many fabricating difficulties.

And our Metallurgical Department is giving a helping hand to fabricators of Stainless Steel who face new war production problems.

Use the suggestions on this page as *your* starting place for increasing the production of Stainless Steel parts. And when you are faced with a particularly tough problem, take advantage of the diversified experience of Carpenter's service representatives and metallurgists.

## Check these production Hints...

1. **FORGING** — Preheat Stainless slowly and bring it up to proper forging temperature. Never run furnaces hotter than the recommended forging temperatures.
2. **GRINDING** — Don't increase wheel pressure to save time. It overheats the metal, causes discoloring and distortion.
3. **STAMPING** — Re-check layouts to keep skeleton scrap losses at a minimum.
4. **DRAWING** — Be sure gauge of Strip is uniform. Off-size material can produce tearing and galling. Non-uniform material can cause wrinkling in the die.
5. **TUMBLING** — Be sure that "soft" water is used in the barrel. Hard water "coats" the balls, prevents them from giving parts a bright, clean finish. Check with your water

company on the "hardness" of the water you use.

6. **NARROW** Stainless Strip of specified width can often be used in place of sheet. This saves time spent handling sheet and allows more economical layout. One plant saved 30,000 lbs. of Stainless on one job by making this change.
7. **PRESS SPEEDS** — Only correct press speeds give maximum output. Faster press speeds may be the answer to your problem. Or perhaps slower press speeds would overcome die galling that interrupts production.
8. **CHECK PHYSICALS** — Can you take advantage of the natural strength of Stainless by using a lighter gauge Strip? When possible, an embossed rib can add extra strength to permit the use of lighter gauges.



The Carpenter Steel Company  
121 Bern Street, Reading, Pa.



For more of the kind of engineering and fabricating assistance you need today, ask for a copy of "Working Data for Carpenter Stainless Steels". It contains detailed information to help you select and fabricate Stainless Steel to meet your requirements. A request on your company letterhead will start a copy of this new 100-page Working Data Book on its way to you.

# Carpenter STAINLESS STEELS

BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

# Washington . . .

• **Ordnance factories will produce close to 60,000 tanks in 1942, meeting goal set by President . . . Nelson wins decision from Gen. Somervell, and WPB will schedule aircraft production, but ultimately the settlement may not prove so advantageous to WPB.**



**W**ASHINGTON — Even though the tank program has been cut back sharply in a readjustment of military sights, ordnance factories will produce close to 60,000 tanks in 1943, meeting the goal set by the President. However, the War Department had planned for the next year a tank program which would consume more than half of that year's alloy steel production.

Confirming the cut was the halting of the \$45,000,000 expansion of the Continental Ordnance plant, Hammond, Inc., recently announced by WPB. The Hammond facilities were to be devoted to the production of cast armor for tanks and planes.

As a result of abandoning the expansion, considerable material savings were made. Blueprints called for \$8,144,914 worth of critical materials, including 20,000 tons of structural shapes, 18,000 tons of reinforcing bars, 28,000 tons of slabs and plates. Approximately \$9,000,000 worth of machine tools would have been used, besides 65 overhead cranes to cost \$3,000,000 would have been purchased.

\* \* \*

## **Steel Men In CMP Class**

On Monday of last week the vice presidents of the major steel producers met with Hiland G. Batcheller, Steel Division Director and were told about some of the newer phases of CMP. Order rejection

procedure was discussed. This week, steel company presidents will be CMP-indoctrinated.

\* \* \*

## **Union Fears May Force Accord**

CIO-AFL peace moves were met with "wanna bet" remarks from observers who cannot believe the labor organizations will be able to quit their jurisdictional quarrels. However, if apparent accord is reached, it is believed that the unification will rest on union fear that the new Congress is going to revise labor regulations.

Harold Ruttenberg, CIO Research Director, recently appointed labor advisor to the Steel Division, will receive \$6500 a year and under the law, while acting in a government capacity, cannot accept remuneration from his union. Steel Division officials have expressed pleasure at Mr. Ruttenberg's attitude of complete cooperation.

\* \* \*

## **Nelson Wins Decision**

Donald M. Nelson, WPB Chairman, has won a decision from General Brehon B. Somervell, Chief, Army Services of Supply, it is reported. At least, WPB will schedule aircraft production. Also, WPB has issued an order confer-

ring the duties on Charles E. Wilson, WPB Production vice-chairman.

When the smoke has cleared away, the details of the WPB-Army settlement may prove not so advantageous to WPB as originally reported, military spokesmen assert.

\* \* \*

A most common sense view of the whole thing has been taken by Ferdinand Eberstadt, WPB vice-chairman on programs. Mr. Eberstadt publicly stated that the row was only the "natural outgrowth of the impact of serious, vigorous and earnest men intent upon doing their job at all costs."

Officials close to Mr. Eberstadt say that his original reaction to the scrap was the cool suggestion that Mr. Nelson deal with General Somervell's boss, Henry L. Stimson, Secretary of War, instead of treating with the fiery general. The story puts in the shade rumors that Mr. Eberstadt has represented the armed services in his capacity of WPB vice-chairman.

The report of other top ranking WPB officials is also to the contrary on this point. Some of Donald Nelson's closest adherents say that no one has been more fearless in

**KAISER MEETS THE BOYS:** At the National Assoc. of Manufacturers' War Congress in New York, Henry J. Kaiser (left) is shown shaking hands with F. C. Crawford, president of Thompson Products, Inc., of Cleveland. Looking on is William P. Witherow, NAM president.

*Press Assoc. Inc. Photo*



## 100,000 More Tons of Steel for Victory with Compliments of Basic Engineers

**I**N the year since Pearl Harbor, Basic service engineers have installed Ramix bottoms in 39 open hearth furnaces and major repairs in many more. Each job has meant a saving of 5 to 10 days in construction time.

By getting these furnaces into production so much sooner, operators have been able to turn out nearly 100,000 tons more steel than would have been possible had conventional burned-in magnesite-and-slag bottoms been installed.

Every open hearth and electric furnace man today knows Ramix. Of 188 basic steel plants in the

United States and Canada, 147 or 78.2% are using this cold-ramming, quick-setting magnesia refractory. Of 95 electric steel producers, 75 or 78.9% have one or more hearths of Ramix. Many others are using it as a repair material. Operators and engineers alike subscribe to the belief that a Ramix hearth is as near foolproof as present knowledge can build.

Basic Refractories, Incorporated offers this product and the services of its field engineers to assist any and every steel plant in producing the maximum tonnage of steel which is needed to bring Victory to American arms.



### BASIC REFRACTORIES, INCORPORATED

845 HANNA BUILDING • CLEVELAND, OHIO

*Ramix is made in Canada, for sale outside U. S. A. and Mexico, by Canadian Refractories, Limited, Montreal, Quebec*





**WAR ENGINE:** The first of six big sixteen wheel locomotives being built by Baldwin Locomotive Works, Philadelphia, for war hauling over the Richmond, Fredericksburg & Potomac Railroad, is pictured just before making its maiden run. Inset are R.F. & P. president, Norman Call and wife.

WPB dealings with the Army and Navy than Mr. Eberstadt.

\* \* \*

#### Fewer Questionnaires Urged

The Joint Committee on Reduction of Non-essential Federal Expenditures is going all out for reduction of the number of government questionnaires and also simplification of this reporting. When the study is made, if the Committee decides to, it is evident that the Bureau of the Budget is going to be shorn of its authority in this

respect. As far back as 1922, the Bureau of the Budget was given this power. Now it looks as though Congress is in the mood to pick another group to apply the scissors to the red tape.

\* \* \*

Steel mill representatives who have come to Washington recently have complained about the load of government reports. One operation engineer said that it took him three hours every day to sign the government forms. He declared that frequently he did not have

time to read the reports before he signed.

Moreover, one executive said that office space in one mill had had to be increased 400 per cent since 1939 and clerical help boosted more than 1000 per cent.

#### RFC Reports 1337 War Plants Financed

Washington

• • • The Reconstruction Finance Corp., reporting as of Nov. 1, announces the financing or contracting to finance the construction, equipment or expansion of 1337 plants for the production of munitions. These plants cost a total of \$8,333,839,503 and over 800 of the total are already partially or completely in operation.

These facts were elicited by the Senate Committee on Banking and Currency from a report by Secretary of Commerce Jesse Jones submitted to obtain approval of RFC's request for additional operating funds. The House, as a result has approved an additional \$5-billion in blank check form.

Commitments have been made for the construction of 144 new steel plants of various size and installation of equipment in 29 existing plants. These plants will be operated under lease by 83 different, existing, privately owned companies. Largest steel plant construction jobs are the new plant being financed for Henry J. Kaiser at Fresno, Cal., at a cost of about \$79-million and the plant for Columbia Steel (U. S. S. subsidiary) at Provo, Utah, at a cost exceeding \$150-million. Both plants are expected to be operating partially early in 1943.

#### THE BULL OF THE WOODS

BY J. R. WILLIAMS



#### Two Expansions Approved By Defense Plant Corp.

Washington

• • • Defense Plant Corp., RFC subsidiary, has authorized the following contracts:

Owens-Corning Fiberglas Corp., Toledo, Ohio, for additional plant facilities in Ohio at a cost in excess of \$500,000, making a total commitment of more than \$1,800,000.

Fairchild Engine & Airplane Corp., Hagerstown, Md., for additional plant facilities in North Carolina, at a cost in excess of \$300,000, making a total commitment of more than \$3,000,000.



Good tools occupy a key position in the manufacturing program of today. They can be properly designed only when the production processes and gaging operations are fully considered. Dimensional control is always an important function of the tool designer and should be an integral part of the design problem.

The Contract Work Division of Sheffield is composed of engineers who have had the broadest of

experience in a very wide range of industries. They also have the advantage of a very close association with the manufacturer of gages and a true appreciation of gaging practice. When Sheffield engineers undertake a tooling program, they are prepared to carry it right from the first preliminary sketch through to final working drawings. The most economical sequence of manufacturing processes, handling, and gaging operations is stipulated.



**THE SHEFFIELD  
CORPORATION**

DAYTON, OHIO, U. S. A.





# WEST COAST . . .

**• War contracts to Western areas may be restricted if Government adopts policy of diverting business from districts short of labor . . . S.S. Absentee "launched" with ceremony at Los Angeles yard.**



**L**OS ANGELES—That irresistible flow of contracts stemming from worldwide eruption which has profoundly altered the economic destiny of this community soon may be stopped by a simple bit of Mumbo-Jumbo uttered by Government medicine men if rumors wafting through the vicinity are correct.

When the War Manpower Commission set up for housekeeping, it indicated that certain industrial areas in various parts of the nation were considered critical from a labor supply standpoint. The degree to which labor shortage threatened industrial operations in the various areas was indicated by designating them as Number 1, Number 2, or Number 3 areas, the Number 1 areas being those regions where babies were handed a monkey wrench as they were carried out of the delivery room. Because possibility of developing a further labor supply in No. 1 areas is obviously limited, it was agreed that no more war contracts should be awarded to firms operating there. This restriction was extended not only to prime contracts, but to sub-contracts.

When classification was made, the Los Angeles area was handed a Number 2 ticket, marking the first time in the history of the city that the Chamber of Commerce was willing to accept a Number 2 rating in anything. Now, although the situation has not noticeably

changed to the casual observer, consideration is being given to reclassification, and some of the district's smaller manufacturers are as uneasy as a nearsighted, flat-footed insurance salesman up before his draft board, and the chances of reclassification are understood to be just about as good.

**T**HE big aircraft factories and shipyards are not particularly worried, because they have contracts which extend into the future as far as the naked eye can see. It will take them just about as long to whittle down these backlogs as it would a ten-year-old boy to fell a giant redwood with a penknife. The hundreds of sub-contractors, however, which are located on every other street corner and in a great many back yards are working mostly on short term contracts and do not relish the prospect of boarding up their doors and windows for the duration. The unbiased observer will recall, however, that these smaller companies are extremely allergic to rumors of impending disaster, and shy instinctively every time some minor public official buzzes the suggestion that the entire Pacific Coast be stripped of industry and turned over to the Japanese to raise guayule and sugar beets. Such suggestions are usually traced to their origin in Kansas or Iowa and then jettisoned in favor of increased parity payments. Although these sub-contractors and parts manufacturers may be troublesome to the prime aircraft and shipbuilders at times, the truth of the matter is that the prime contractors would be as uneasy without their small suppliers as a sow without sucklings and have about as much of a chance of survival as sucklings without a sow.

**A** PARTIAL answer to the problem of full utilization of manpower may be that described in this column last week, in which Consolidated Aircraft Corp. of San Diego—a Number 1 labor area—had decided to set up company-operated parts and sub-assembly plants in twelve scattered California communities. The eastern shore of San Francisco Bay and Portland, Oregon, have also experienced severe labor pains but have pro-

duced no solution. In San Francisco, a Class 2 area, a war center housing director last week made the statement that non-essential tenants may be evacuated to make room for war workers because of insufficiency of available housing units. In some sections of the San Francisco Bay area, loft and store buildings have been converted to dormitories.

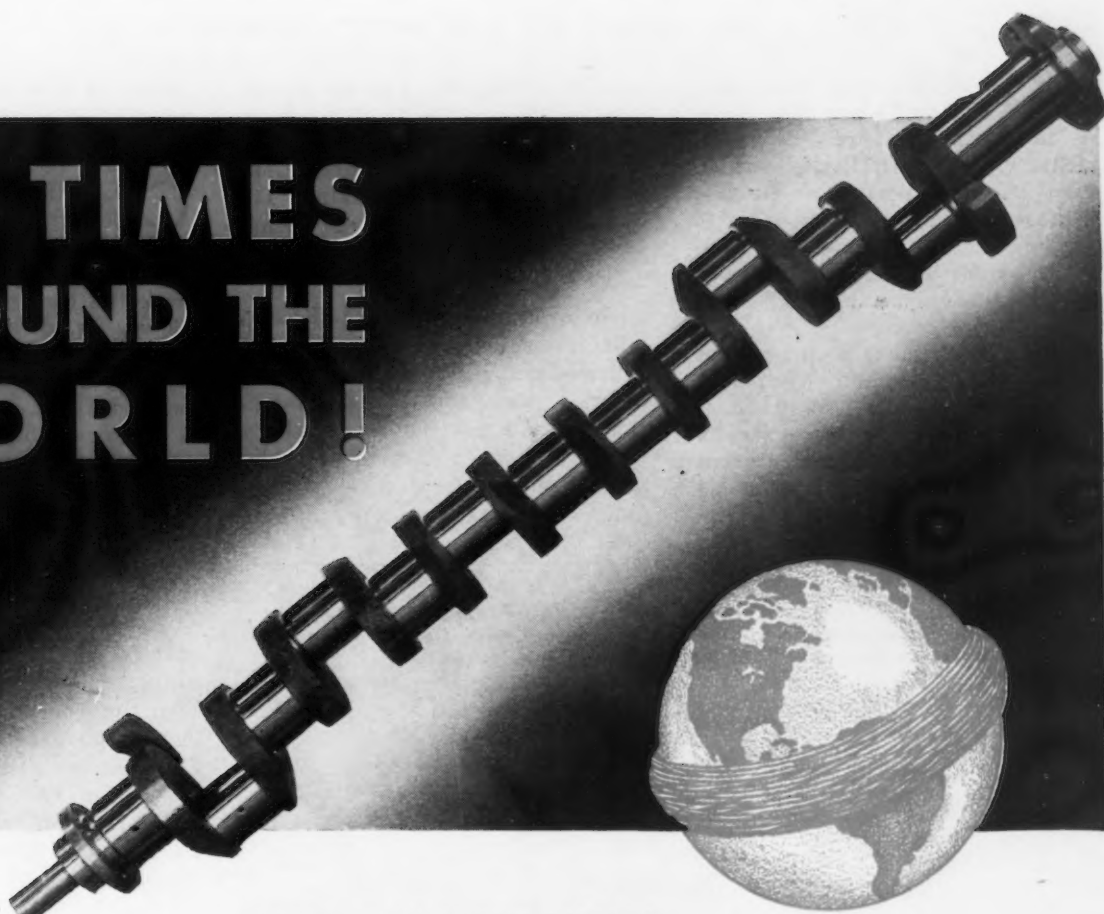
Lest it be assumed that the West Coast has reached a peak in its labor force, California's Senator, Sheridan Downey, who a few years ago was elected to office on a platform of pensions for practically everybody, last week stated that preliminary surveys indicate that the Golden State alone will need 600,000 more workers to supply the armed services and war industry. Only a small portion of that figure represents in-migration, the bulk representing change of occupation within the present population. For instance, Carl W. Flesher, West Coast director for the Maritime Commission, states the shipyards may eventually have as high as 40 per cent of their yard force composed of women workers.

**S**HOPS and foundries in the State of Washington are complaining that wage stabilization, although understood and accepted by employers, is still only half heartedly accepted by the metal trade unions, who are protesting loudly. Shortage of common labor, as well as skilled mechanics and molders, has cut shop production there to some extent. Despite these differences, labor-management relationships are fairly smooth.

Fears that railroad freight movement to and on the Coast would mount constantly to a crescendo have been somewhat allayed by figures showing that November rail freight traffic has declined about 6 per cent from the October average, a normal seasonal recession. Both Southern Pacific and Santa Fe reached October traffic peaks, the former railroad registering its record week for the year, 21.1 per cent higher than its record 1941 week. The first eight months of 1942 found Southern Pacific handling 45.5 per cent more net ton miles of freight than in the corresponding period last year,



# 40 TIMES AROUND THE WORLD!



**AFTER 1,000,000 MILES**

**TOCCO-HARDENED CRANKSHAFT SHOWS ONLY 1/1000-INCH WEAR!**

**O**NLY 1/1000-inch wear on the crankpins after piling up a service of 1,000,000 miles . . . a distance equal to 40 times around the world! That's the record of one veteran TOCCO-hardened crankshaft on one of the country's fastest streamliner trains. Hundreds of thousands of other TOCCO-hardened crankshafts are giving similar performance . . . giving 5 to 10 times normal life . . . avoiding delays for engine overhauls . . . keeping engines of the United Nations on the straight path to Victory.

TOCCO-hardened crankshafts are used by the firms listed.

Investigate TOCCO for improved and faster hardening, annealing, brazing and heating.

**THE OHIO CRANKSHAFT COMPANY**  
Cleveland, Ohio

## THESE ENGINE BUILDERS USE TOCCO-HARDENED CRANKSHAFTS

Caterpillar Tractor Company  
General Motors Corporation  
Seven divisions making trucks and diesel engines.  
Hercules Motor Corp.  
International Harvester Co.  
White Motor Company  
Worthington Pump & Machinery Corp.  
and many others.

**HARDENING  
ANNEALING  
BRAZING  
HEATING for  
forming and forging**



# TOCCO

World's Fastest, Most Accurate Heat-Treating Process

Santa Fe 50 per cent more, and Western Pacific 54 per cent more. A temporary embargo on shipments via Western Pacific was in force during a portion of October because of lack of manpower to handle offered shipments. Generally, traffic difficulties have been few on steel shipments.

**ALTHOUGH** delays in receipt of materials and equipment have placed most new West Coast steel projects far behind schedule, Columbia Steel Co. has started production at its new continuous rod mill, the first of its kind in the

bia, however, by the knowledge that it will receive an Army-Navy "E" on Dec. 19 for the record achieved by its Pittsburg, California, plant for breaking 113 separate production records within the year, from December 7, 1941, to Dec. 1, 1942.

Reiteration by Henry J. Kaiser, who lately has been displaying a renewed and increasing interest in aircraft and copper production, that he will not sell his southern California steel plant to Republic or any other eastern concern varies not a whit from the song he has

tation of Mexican mine workers is expected to alleviate the situation, however.

**CALIFORNIA** Shipbuilding Corp., Los Angeles harbor, the nation's champion Liberty ship producer in point of quantity, broke its own record by launching 13 vessels, delivering 13 and laying keels for 13 more in November. Shortly thereafter the yard pointed up its record by launching a mythical ship, "The S. S. Absentee" at noontime ceremonies before the yard's crew. The mock ceremony effectively called attention to the fact that the yard has 2,000 men laying off the job every day, which has resulted in the loss of 4,800,000 manhours in the 14 months the yard has been building ships, enough time for the construction of 12 Liberty vessels. Although such stunts clearly reflect the nearby Hollywood influence, they have been an effective part of morale programs at the more progressive West Coast plants. Noon hour entertainments are a proven lure in conducting labor recruiting programs, and the larger employers vie with one another for superiority in this department.

**WRECKED—A 109—**One well placed Allied bomb put this timely end to a Nazi Messerschmidt 109 in the western desert near Daba. When the Yanks fix 'em they stay fixed judging from the evidence.

*Press Assoc. Inc. Photo*



Far West. The new rod mill is part of an integrated expansion which will result in greatly increased output of wire products by the Steel Corporation subsidiary. Delays in receipt of materials have been the principal factor in putting behind schedule construction at Defense Plant Corp.'s Geneva, Utah, works, adjacent to Columbia's Ironton plant at Provo. Delay in the reerection of an additional blast furnace at the latter plant has also pushed back its probable production date considerably.

Some solace is afforded Colum-

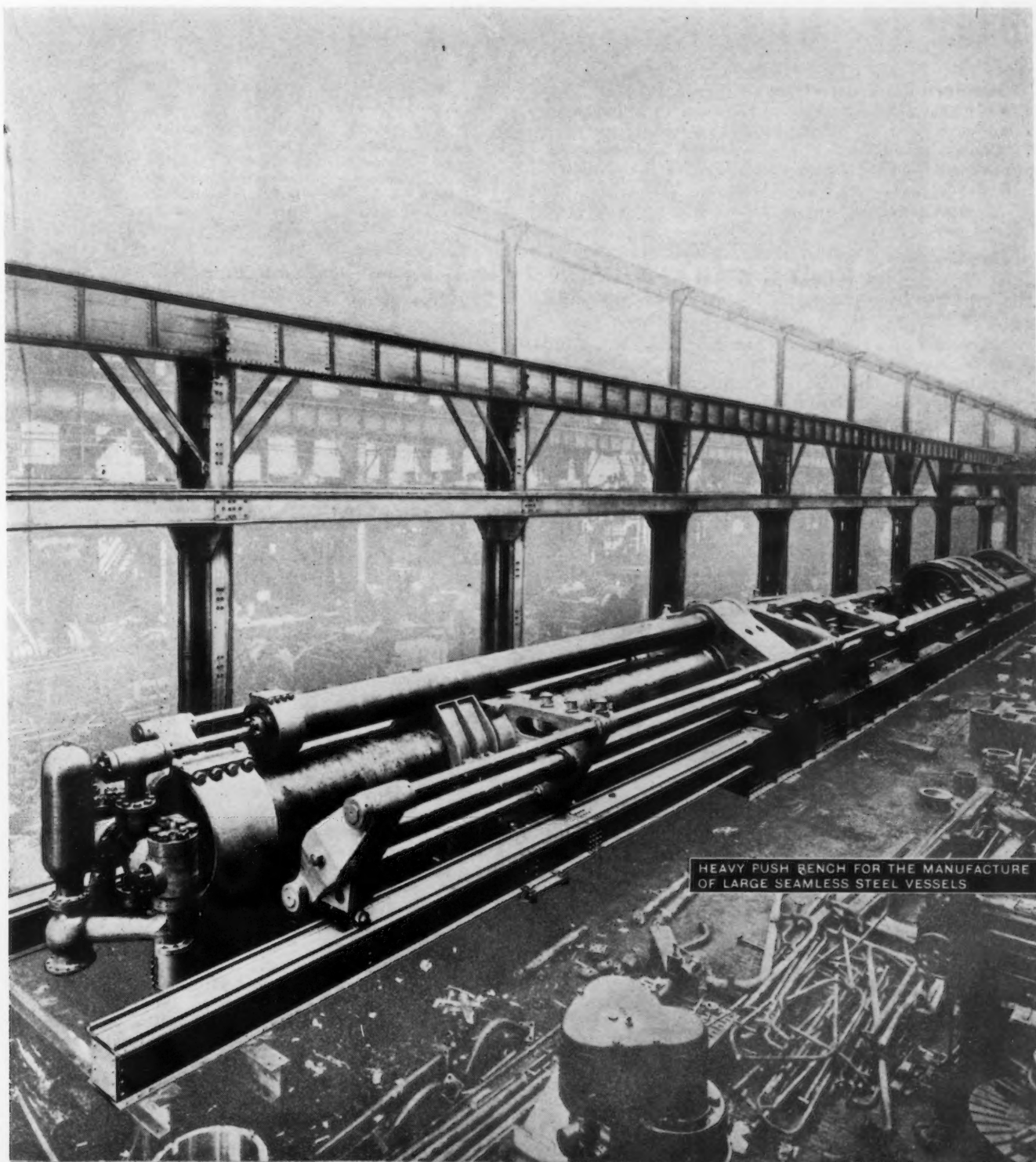
sung here ever since he laid the foundation of his great industrial empire. The Kaiser family has repeatedly pointed out to THE IRON AGE that both it and the industry it has built are in California to stay and not just wartime sojourners. Latest rumors of expanded activities by the clan include an Arizona copper project based on large tonnages of low grade ore to be shipped to a new Kaiser smelter. Such a large scale project would further complicate the state's present copper production problems, revolving in the main about lack of labor. Impor-

### Officers Appointed for Victory Aircraft Ltd.

*Toronto*

• • • C. D. Howe, Minister of Munitions and Supply, announced the appointment of the following officers of Victory Aircraft Ltd., the Government company recently established to operate the Malton aircraft plant formerly owned by National Steel Car Corp.: President, J. P. Bickell of Toronto, president of McIntyre Porcupine Mines Ltd., and director of International Nickel Co. of Canada Ltd. Directors are, S. H. Logan, Toronto, president of the Canadian Bank of Commerce; Donald MacAskill, director and former general manager of International Nickel Co. of Canada Ltd.; E. C. Fox, chairman of Canadian Cottons Ltd., and W. Kaspar Fraser, barrister. Mr. Howe stated that "the above directors are all serving without remuneration of any kind and under their direction the Lancaster program will be carried through."





HEAVY PUSH BENCH FOR THE MANUFACTURE  
OF LARGE SEAMLESS STEEL VESSELS

# HYDROPRESS · INC.

ENGINEERS

CONTRACTORS

**HYDRAULIC PRESSES · ROLLING MILLS  
PUMPS · ACCUMULATORS**

570 LEXINGTON AVENUE · NEW YORK · N. Y.



# Fatigue Cracks

BY A. H. DIX

## Sea-Born Tongue Twister

• • • The most attractive aggregation of alliteratives we have seen in a long time appeared recently in "Chock-a-Block," the U.S.S. Atlanta's mimeographed newspaper, relayed to us by the Federal Shipbuilding & Drydock Co.:

Don't forget to get a bunch of bonds, to buy a bunch of bombs, to bomb a bunch of bums.

## Thresholders

A recent issue referred to "weldments." What are weldments and how can such abuse of the language be tolerated?

—A. W. Miller

A weldment is a welded structure. It is not a new-comer, and like its cousin "weldery" (a place where welding is done), it has been standing timidly in the etymological anteroom for ten or fifteen years. But a decade or two is as a day in the probationary period of a new word. We shall know, say about the time the next war is due, whether these words will be invited in and made full-fledged members of the club. By 1965 even A. W. Miller may be able to hear them without wincing.

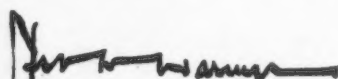
## Name for Lady Welders

• • • Something should be done, too, about another department of welding terminology. The operator is called a welder, and the same term is applied to the equipment. A Coast union tried to correct this recently by recommending that the operator be known as a "weldor."

This fell through, perhaps because "weldor" and "welder" are confusingly similar in spelling and pronunciation. In another field both machine and operator were formerly known as "typewriters," but the latter is now known as "typist." "Machinist" designates the man who runs a machine tool. Therefore, "weldist" is a natural to apply to a person who does welding. At first glance it has a slightly emetic effect even on us, and its forced adoption might cause labor trouble. So we suggest that it be tried first on the women operators, as they are newer at the work, and for that reason, more tolerant.

## Name-Disguiser

To your collection of strabismic signatures you might add:

  
**General Manager**

REPRESENTATIVES IN PRINCIPAL CITIE

The offender is Armco International Corporation's g.m., G. W. Warner.

—Bill MacFee

## From Henry, Without Love

• • • We are indebted to Miss Jane Butzner, of the brains department, for this nine-pronged harpoon O. Henry is said to have flung in the direction of a parsimonious acquaintance—"His umbilical cord must have been a wampum belt."

## Verbal Rembrandt

• • • Speaking of the gift of arranging words in sparkling order, we are constantly tempted to pull plums from the rich pudding the writer of the "West Coast" section sets before you each week. The tempta-

tion to Jack Horner this recent one is too great to resist, so here goes:

• • • equally fertile seeds for secession have been nurtured in West Coast business communities by the mail order government which fills orders only at Washington, D. C. Mail order government, in itself, would not have contributed so heavily to the far western complex if the mail and the order fillers were as rapid as when the Sears catalog climbed the social ladder from the out-house to the parlor table.

## Army-Navy Prayer to S. Claus

• • • If you are wondering what Christmas gift to send to a friend in the service you might get an idea from a survey conducted by our sister-publication, *Department Store Economist*. Aside from collapsible blondes, furloughs and cigarettes, the Army man yearns most, in this order, for a waterproof wrist watch, a portable radio, regulation shirts, leather wallet with insigne, and pen and pencil set (clips at top).

The Navy votes first for the waterproof wrist watch, next for the radio, wallet, photographs of friends or family, and overnight bag. No. 1 on the hate parade is cribbage boards, with checkers as runner-up, followed by diaries, chess sets, and money belts.

## They Won't Let Us Play

• • • "Tide," the advertising journal, is trying to find out what business paper has been published longest under the original name and ownership. Honors so far are claimed by a publication that started in 1865.

John Williams put the first issue of your favorite family journal to bed in 1855, but we are out of the running, as there hasn't been a single Williams around the place since "When Knighthood Was in Flower" was booked three months ahead at your local library.

We didn't want to play anyway. Not that we have anything against longevity in ownership, so long as the management policies don't linger overlong in the shadow of the founder. For the formula that was surefire during Grover Cleveland's second administration is certain to be miles off target in Roosevelt's third.

Corporate senility and age are, of course, totally unrelated. Some businesses run to nearsightedness and paunchiness in a quarter century or less. Others approach the century mark with the vision of a fighter pilot and the vigor of a paratrooper. The maintenance of 20-20 acuity and 130 blood pressure are the reward for fairly frequent infusions of new blood and new outlooks.

You can get these infusions and still be under the original ownership, but nevertheless we are glad there is no Williams to glance at a picture of the founder in oils, which would be sure to be hanging in his office, and say reverently, "He saw a great future for wrought iron."

## Lapsus Linguae

• • • A perfectly natural slip of the tongue was made by Hiland G. Batcheller, chief of the WPB Iron and Steel Division, in an excellent address on steel output, delivered last week at the National Association of Manufacturers' annual convention. In referring to the United Nations he spoke of "the United States and its alloys."

## Puzzles

Last week's problem would have figured out 215)123195(573 if one of the dots hadn't been left out of the dividend. It should have had six dots.

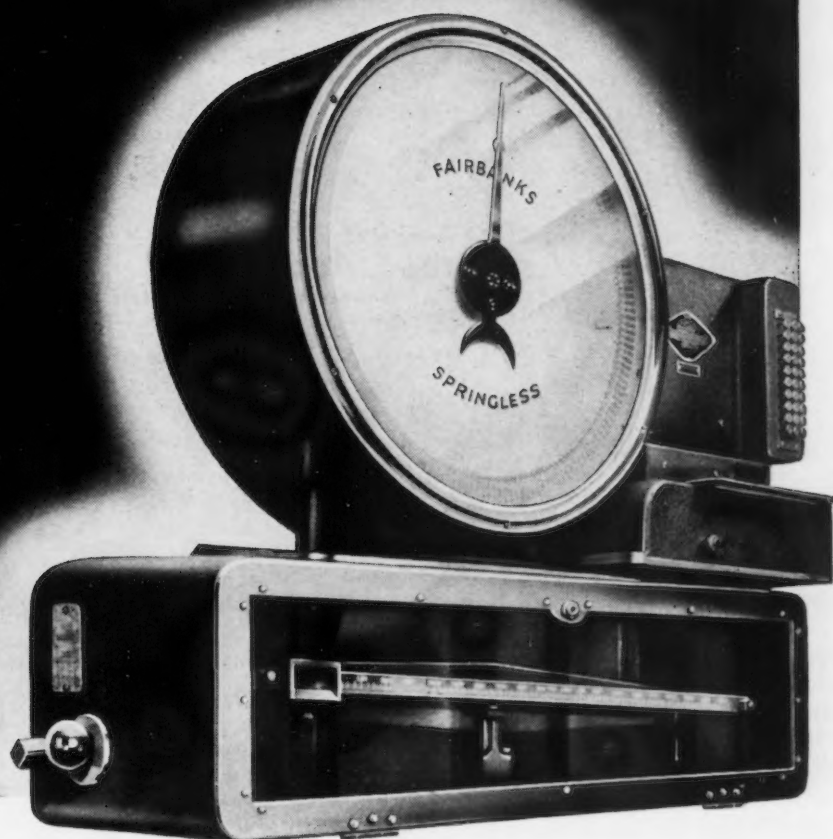
The Oct. 26 spread for geometrical gourmets was masticated satisfactorily by S. Davis of Noorduynd Aviation, Ltd., Otto J. Nussbaum of Kramer Trenton Co., Jules Friend, and Lt. Com. A. R. Simpson. The answer is .483871.

The Lt. Com. contributes this ennuil eliminator:

A 1 ft. cube is rotated about its longest axis (corner to corner). What is the shape and volume generated?

# Blocking

**THE INVISIBLE SABOTEUR!**



**E**RRORS that could be prevented . . . operations that could be speeded up . . . methods that could be improved . . . all of these and others accomplish the ends of the saboteur even if they are unintentional.

Frequently engineers and executives are amazed by the timesaving applications that can be made with modern scales. For modern scales are *much more* than better weighing instruments. They count small parts. They weigh materials and com-

modities in motion. They read and keep books, making **PRINTED RECORDS**, much faster and with *unfailing accuracy* impossible for human eyes and hands.

Use your priority to get Fairbanks weighing equipment that will block the invisible saboteur in your plant, *now* — and make money for you in years to come. Fairbanks scale engineers are ready to help you. Fairbanks, Morse & Co., 600 S. Michigan Avenue, Chicago, Illinois.

## **FAIRBANKS-MORSE**



**SCALES  
DIESELS  
MOTORS  
PUMPS**

# Dear Editor:

## MACHINE TOOL PRIORITY

Sir:

We are taking the liberty of calling your attention to what appears to be an error on page 129F of the November 12 issue under the heading "Revisions to the Iron Age Priorities Guide." It is stated that E-1-b gives a higher preference rating on machine tools to manufacturers of aircraft. What the amendment actually does is to give preference to aircraft orders in scheduling; it has no effect whatever upon the preference ratings. The amendment sets up two (2) general classes of Service Purchasers defined as Type 1 and Type 2; Type 1 includes the aircraft orders and has preference over all other Service Purchasers in the delivery schedule.

F. R. DANIELS,  
Priorities Director

Waterbury Farrel Foundry &  
Machine Co.,  
Waterbury, Conn.

• You are right, Mr. Daniels.—Ed.

## CUTTING TOOL BOOKLET

Sir:

Please send us your pamphlet, "How to Increase Cutting Tool Life." This will be greatly appreciated, as it will prove most valuable and educational to us in our work.

DAVID PRAEGER,  
Division Supervisor

Department 23,  
Lockheed Aircraft Corp.,  
Burbank, Cal.

## THE EMPTY CHAIR

Sir:

I would appreciate 6 or 8 copies of Mr. Van Deventer's article, "The Empty Chair," Oct. 29 issue.

E. R. DUNN,  
Advertising Manager

Bulldog Electric Products Co.,  
Detroit, Mich.

## JAP MAP

Sir:

In one of our classes at Marquette University we are studying World Resources and Industries. In one of your spring issues, a map of Japan's war plants and products was shown. It would be of great help if we could get a copy.

HENRY W. HOFFMAN  
Milwaukee, Wis.

• Copy is being sent. The map was in the April 30 issue.—Ed.

## PHOTOELASTICITY

Sir:

I am desirous of obtaining the article "Photoelasticity as Applied to Design Problems," by O. J. Horger and T. V. Buckwalter which appeared in your May 23, 1940 issue.

WILFRED A. PEARCE,  
Stress Project Engineer

Boeing Airplane Co.,  
Wichita, Kansas

• Clipping mailed.—Ed.

## TOOL STEEL DIRECTORY

Sir:

Will you please advise the writer at once if the "Tool Steel Directory" is available and where we may obtain 6 or 8 copies. This would make an ideal reference in our line of defense work.

J. W. AUSTIN,  
Purchasing Department

Sylvania Electric Products, Inc.,  
Ipswich, Mass.

• Copies are available, 25c. each.—Ed.

## AIRCRAFT SHEET METAL PARTS

Sir:

Please forward twelve reprints of the series, "Making Aircraft Sheet Metal Parts," which appeared in your May 28, June 4, 11, and 18, 1942 issues.

WESTINGHOUSE ELECTRIC &  
MANUFACTURING CO.

East Pittsburgh, Pa.

• They are being sent. The price of this 24-page reprint is 25c. each.—Ed.

## COMPARABLE TOOL STEEL CHART

Sir:

Will you be kind enough to mail to the writer immediately one copy of your Comparable Chart on various grades of tool steels.

We are sure that this chart will be very valuable to us in ordering tool steel.

B. E. GARDNER,  
Purchasing Department

Chrysler Corp.,  
Detroit, Mich.

## TIN CAN SALVAGE

Sir:

Would you please send the writer a list of plants operating as detinners?

THEOBALD GUNTHER,  
Salvage Manager

United States Rubber Co.,  
Marion, Ohio

• See page 92H of Oct. 29 issue.—Ed.

## POWDERED IRON STATISTICS

Sir:

The Chemical Foundation, Inc., suggested that you might have some statistics on powdered iron and, as I am anxious to get some idea of how much powdered iron is being produced at the present time, and what the present production is on both powdered iron and powdered bronze castings, would appreciate any statistics you may have on the subject.

D. G. MacVICAR

Naugatuck, Conn.

• Producers of powdered metals have been highly secretive concerning operations and, as far as we know, no statistics are available.—Ed.

## STEEL ANALYSES

Sir:

In your Nov. 19 issue, pages 51-54, appears a most useful reference list

of significant steels commonly used for specific articles.

I hate to spoil the office copy and wonder whether it is possible to obtain a reprint.

ALFRED MEALAND,  
Director Machine Tool Division

Commonwealth of Australia,  
War Supplies Procurement,  
New York City

• Reprints are available. It is a pleasure to send you one.—Ed.

## SEVEN-DAY WORK WEEK SCHEDULE

Sir:

Could you tell me where I can obtain either reprints or information direct on some of the several schemes I have read about on staggering the work week to avoid working our employees seven days per week without a break for rest and relaxation.

PHILIP C. REED,  
Superintendent

Pittsburgh Plate Glass Co.,  
Ford City, Pa.

• See the article, "How to Operate Seven Days Per Week," which gives the best seven operating schedules (page 47, issue of Dec. 25, 1941). Clipping has been mailed you.—Ed.

## ELECTROPLATING

Sir:

From time to time in your publication articles of interest to electroplaters are written. Do you have reprints of any of these articles and if so, how much?

KENNETH E. WALL

Detroit, Mich.

• Most of these articles have been reprinted in the 245-page book, "Cleaning and Finishing Metal Products," priced at \$2.50.—Ed.

## "HOME WORK WITHOUT TEXT BOOKS"

Sir:

Would it be possible to secure 75 reprints of Mr. Van Deventer's editorial "Home Work Without Text Books" in your issue of Nov. 26.

F. R. PALMER,  
Vice President

Carpenter Steel Co.,  
Reading, Pa.

Sir:

I am very much impressed by J. H. Van Deventer's editorial "Home Work Without Text Books" which appears on page 47 of your Nov. 26 issue. If reprints of this editorial are available, I would like very much to have 100 copies.

L. B. WORTHINGTON,  
Vice President

Scully Steel Products Co.,  
Chicago

Sir:

Could you furnish us with 100 reprints of the editorial entitled "Home Work Without Text Books"?

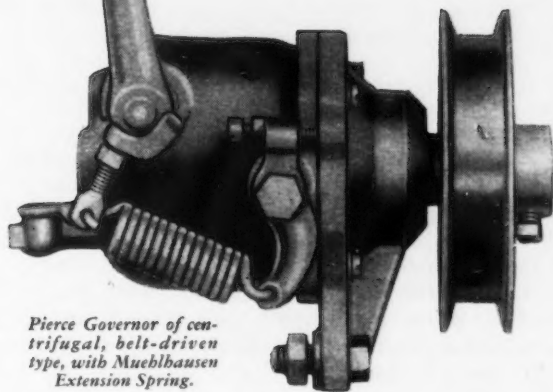
Please tell Mr. Van Deventer for me personally that I have greatly enjoyed reading this vital editorial.

PAUL TEAS,  
President

Paul Teas, Inc.,  
Cleveland



How  
Muehlhausen  
Springs  
*keep the  
highway fleets*  
**ROLLING**



Pierce Governor of centrifugal, belt-driven type, with Muehlhausen Extension Spring.

**T**O MEET wartime's tremendous demands, trucks must keep moving—on long, grueling hauls—without delay! And Muehlhausen Springs play important parts in maintaining the efficient operation of these highway fleets.

The rugged strength, plus extremely accurate design and fabrication of these springs, assures precision performance under all conditions. On governors, for example, Muehlhausen Springs are subjected to severe abuse. In hot, corrosive atmospheres, they are flexed thousands of times daily—yet, there must not be the least variation in load capacity.

Such performance is the result of Muehlhausen's advance spring craftsmanship, and the close collaboration this company maintains with its customers' engineers. All problems are solved *before* the springs are made.

Muehlhausen can do the same for you—with springs of every type. For quick action—call, wire or write today! MUEHLHAUSEN SPRING CORPORATION, 817 Michigan Avenue, Logansport, Indiana.



**FREE! SEND FOR  
INFORMATION**

- New Die Spring Bulletin illustrates, describes 206 sizes and types of die springs.
- New Armament Bulletin shows importance of springs for many types of war equipment.



# This Industrial Week . . .

- **Industries Move with More Assurance**
- **Box Score Shows Tremendous Output**
- **Steel Backlogs Not So Sharply Reduced**
- **CMP Contains Some Unsolved Problems**
- **Ingot Output Steady at High Level**

**E**MBARKING this week on a second year of all-out war production, the metals and metal working industries are moving with more assurance than at any time since the war transformation began.

Statistics issued this week showing unprecedented United States' production in 1942 have lent confidence toward the accomplishment of new goals. Furthermore, much of the confusion which existed a few months ago has been dispelled. The war machine seems better integrated and better directed.

The box-score announced this week, giving part of the answer to where steel went in 1942, shows that the United States has produced the following items since Pearl Harbor:

- 49,000 planes (14,000 in 1941)
- 32,000 tanks and self-propelled artillery (4000 from July, 1940, to January, 1942)
- 17,000 anti-aircraft guns larger than 20 mm. (850 from July, 1940, to January, 1942)
- 8,200,000 tons of merchant shipping (1,640,000 tons in 1941); naval ship production trebled over 1941.

**M**ACHINE tool output in 1942 will be 1300 per cent above the 1929-1938 yearly average. The industry supplied, for war output in October, 22,500 machine tools out of a record-breaking total production of 30,000 units that month. The backlog of unfilled orders is estimated at over \$1-billion, equal to 7½ months by the entire industry.

Steel ingot production of around 86,000,000 net tons in 1942, including a sharp rise in electric furnace output, is another impressive feature of the nation's tremendous production record. New capacity is being added steadily. The industry will start the new year comfortably supplied with iron ore and with the prospect of scrap stockpiles well above the 4,400,000 tons on hand last Jan. 1. Shipments of steel in 1942 are believed to include all-time record exports.

Much benefit has accrued to the steel industry recently as a result of controls on consuming industries and the perfection of allotment and direct allocation orders. A few months ago all was confusion in the industry, with no one knowing for sure where it was heading. However, contrary to some reports, mill backlogs have not been reduced as much as generally supposed. On the first of December backlogs were estimated to be about 15 to 20 per cent less than at the start of October. Practically all this reduction was due to WPB's effort to strike a balance between supply and

demand by drastic curtailment in PRP and further limitations on the use of steel. Meanwhile, steel orders so far in December, have been equal to or in excess of actual production.

**U**NDoubtedly, steel backlogs will be whittled down slowly between now and July 1, 1943, when the new Controlled Materials Plan becomes effective. By that time, any orders on steel mill books which do not have allotment numbers probably will be cancelled outright. The so-called suspension of orders for various ordnance and other projects has not affected, to any great extent, present steel backlogs. Much of this business has been suspended but not cancelled.

Mills desire backlogs and a good product mixture as assisting economical operations. On some products, at least three weeks orders are deemed best for economical operations, while in other lines even more backlog is sought.

In some quarters it is believed there will be many headaches before CMP is finally put into operation and there may be temporary backups to the ingot. How-

*More questions and answers on CMP appear in this issue on pages 132-133.*

ever, so far, rapid recoveries have been made from the temporary unbalances in raw steel inventories.

Recent meetings held in the Middle West show that the new CMP needs much explaining and contains some unsolved problems at present. One of the questions in the air is the mechanics of controlling materials going into repair and maintenance; how priorities rating will be passed from the consumer to the manufacturer. Probably certified purchase orders will be sent from the consumer to the contractor and then to the supplier, who will make a total report. At the manufacturer's level, the cycle will be made to conform to the CMP. WPB officials are planning a simple approach to the control of inventory under CMP and may permit a maximum of 45 days' inventory of controlled materials.

Tin plate production will be stepped up substantially in 1943 over preliminary estimates made a few months ago. By the first of the year many of the economical electrolytic lines will be in operation.

**T**HE alloy steel situation continues to remain tight and supplies of certain alloy steels are far from meeting demand. The hot top bottleneck still exists. An increase in alloy steel production brings



the possibility of an overall reduction in total steel ingot output. Alloy steels take much longer to melt than ordinary carbon steels, and require more processing. Alloy steel production this year will be about 13 per cent of the total steel produced. Next year the per cent will gain again.

Reports from the Chicago area indicate that several additional phases of the war program have been trimmed back recently, but so far the reductions have not been reflected in large scale cancellations of steel orders. Apparently, airplanes are now the key to all planning. The aircraft building program for the coming year is double the goal of 1942. Instead of the 60,000-plane schedule for this year, the 1943 program calls for 100,000 ships, a larger proportion to be heavily armored bombers, many of them to come from the Willow Run plant now in operation. The actual breakdown of types of planes is unknown to anyone except government officials, but it is understood basic and advanced type trainer planes also occupy prominence on the schedule to serve an influx of youthful aviation recruits.

By the end of 1943, Donald M. Nelson expects America alone will produce almost as great a volume of armaments as all the rest of the world combined, Allies and enemies together. One year from now American production will be nearly twice as large as that of the Axis, he says, adding a warning that "we dare not, for our lives sake, make the mistake of relaxing."

**S**ETTLEMENT of the controversy between the armed services and the WPB as to production scheduling indicates that the contracting procedure and the scheduling method as now exercised will not be altered greatly. Certain scheduling functions are subject to WPB direction and it also is indicated that WPB vice-chairman C. E. Wilson may intervene in any production program. The action is seen by some persons as a compromise arrangement since it does not interfere too much with the military services.

The 3 per cent freight tax which went into effect last week has caused confusion temporarily in the steel industry. On raw materials, mills will pay the tax. On sales of steel made into arbitrary basing points, the tax will be absorbed by producers. On

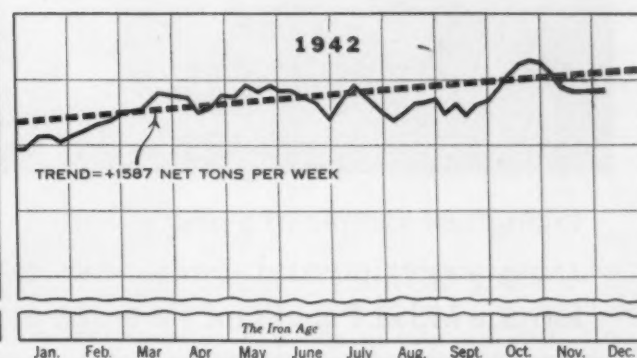
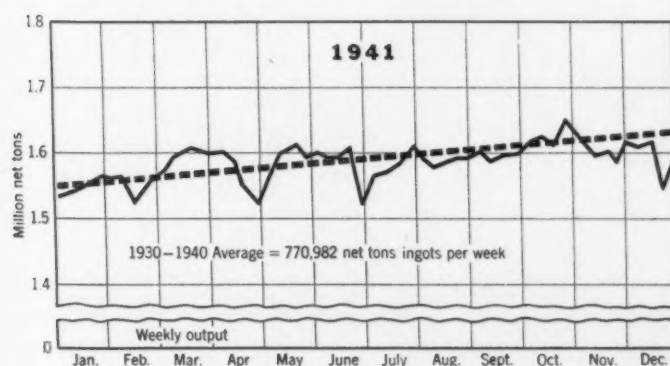
## Instruction Booklet on Controlled Materials Plan

• • • Demand for detailed information on the Controlled Materials Plan, as published in recent issues of *THE IRON AGE*, is sufficiently great to warrant reprinting the data in a 16-page booklet, titled, "How to Operate Under the Controlled Materials Plan." Copies are available at 25c. each. Please send stamps with orders for four or less. Address *THE IRON AGE*, Reader Service Department, 100 E. 42nd Street, New York.

sales made by the customary basing point method the customer will pay the additional amount from the established basing point to destination, with producers absorbing only to the extent that they have in the past for competitive purposes.

Another participant entered the argument over iron and steel scrap this week when Lessing J. Rosenwald, director of the WPB Conservation Division, charged that recent statements concerning the size of scrap inventories as well as reports that some mills are so comfortable they are turning down material from recent scrap drives, may seriously affect the government drive to build up a substantial inventory by Jan. 1, 1943. Rosenwald asserted that scrap collections should continue for the duration and warned that the purchased scrap needed in 1943 will be difficult to obtain.

**S**TEELMAKING in the nation this week remained unchanged at 99.5 per cent of capacity for the third successive week, according to estimates by *THE IRON AGE*. Up four and a half points are operations in the Detroit area. Melting rates in the Wheeling district have jumped two points to 91 per cent while in Chicago, output has increased half a point to 101 per cent. Youngstown district operations have sagged a point to 99.5 per cent. Philadelphia is down half a point to 93 per cent and Eastern steel production has dropped by the same amount to 105.5 per cent. Continuing at last week's operating rate are Pittsburgh at 100.5 per cent; Buffalo at 104.5 per cent; Birmingham at 98.0 per cent; Cincinnati at 105 per cent, and St. Louis at 107.5 per cent.

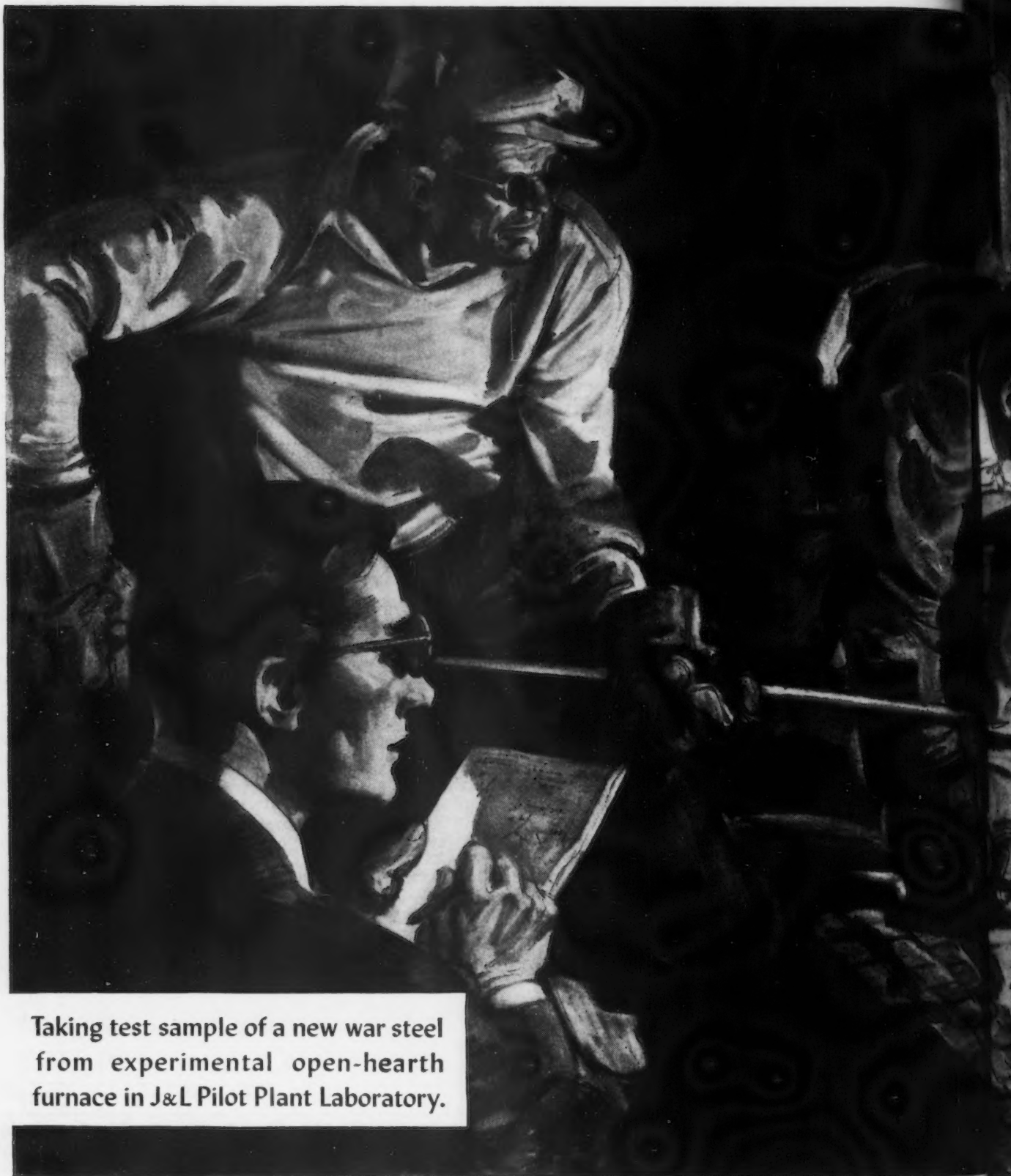


Steel Ingot Production by Districts Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	Ohio River	West	St. Louis	East	Aggregate
December 3	100.5	100.5	100.5	93.5	97.0	104.5	89.0	98.0	104.5	105.0	102.0	107.5	108.0	99.5
December 10	100.5	101.0	99.5	93.0	97.5	104.5	91.0	98.0	109.0	105.0	102.0	107.5	105.5	99.5



# TO CRUSH ENEMY FORCES, SAFEGUARD OUR OWN, IS AIM OF STEEL RESEARCH

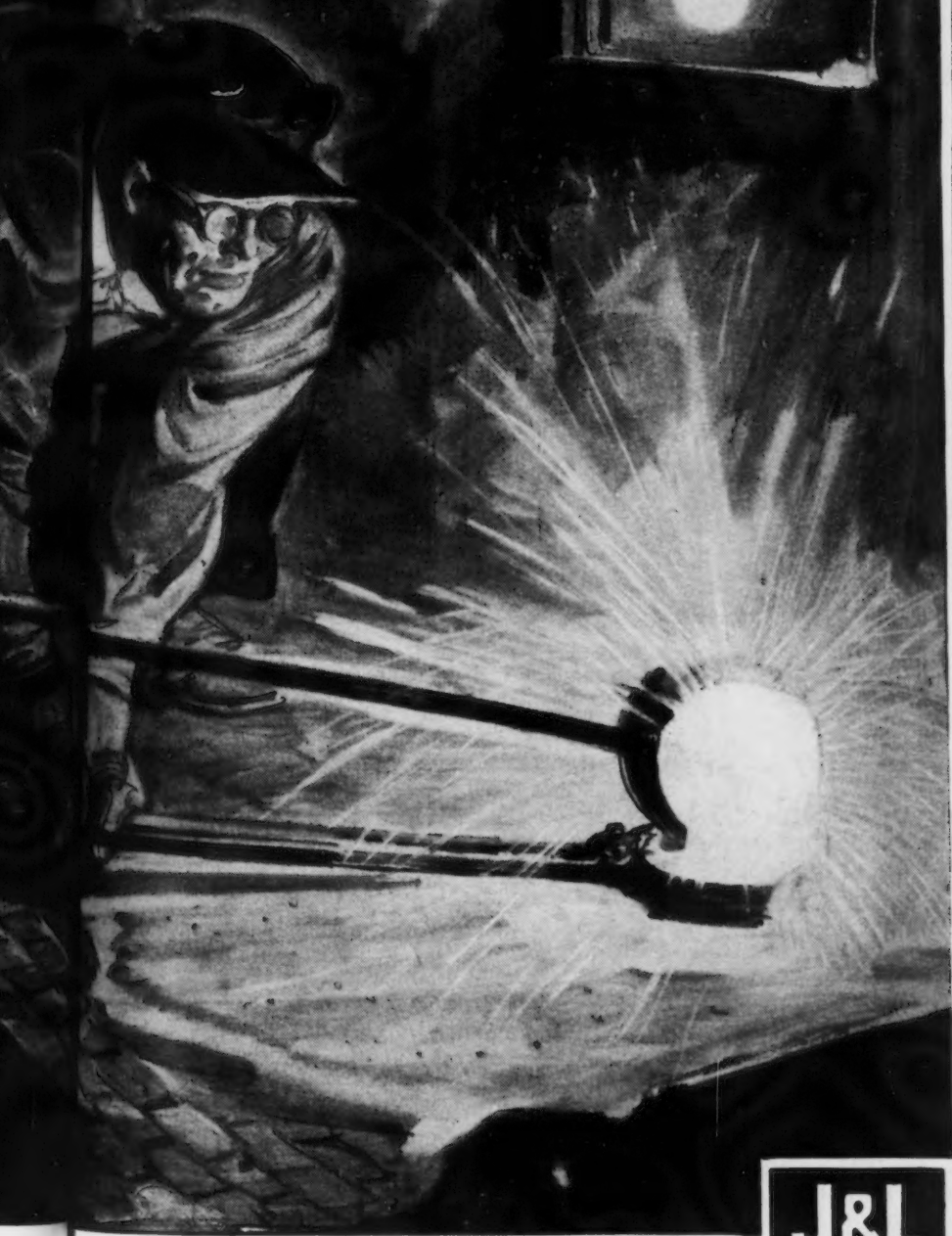


Taking test sample of a new war steel  
from experimental open-hearth  
furnace in J&L Pilot Plant Laboratory.

COPYRIGHT 1942—JONES & LAUGHLIN STEEL CORPORATION

## JONES & LAUGHLIN STEEL CORPORATION

ARD  
RCH



FROM AN ORIGINAL DRAWING BY ORISON MACPHERSON

PITTSBURGH, PENNSYLVANIA  
CONTROLLED QUALITY STEEL FOR WAR

**J&L  
STEEL**

## HUSH-HUSH IN WAR LABS

Censorship and secrecy are rigidly imposed in American industrial laboratories because of startling results in research on new materials and weapons to crush enemy forces, and protect our own, achieved during our first year at war. "Sections of many industrial laboratories are so hush-hush," says Scripps-Howard's *Washington Calling* "even important officials can't get near them. Top war men are cheered by some new offensive weapons you won't hear about for some time."

Steel research had momentum when war came, was able to swing immediately into war-steel development work. Research facilities were available in hundreds of plants. Thousands of trained metallurgists, chemists and skilled research workers had an accumulation of data on the innermost secrets of steel; were eager to put their knowledge to work to help fight the war.

Pilot for peace is now pilot for war thanks to foresight of J&L metallurgists and management who in 1937 took steel research out of the test tube stage, put it on a practical basis in first Pilot Plant laboratory in the industry. Here with small experimental furnaces and rolling mills, research engineers conduct their experiments under conditions that simulate actual mill practice without interfering with mill operations — make it possible for their findings to be quickly applied to the big steel producing furnaces and mills.

Small four-ton open-hearth furnace (capacity each regular steel works furnace averages 150 tons) is keystone of this unique laboratory where practical steel men, technically-trained metallurgists and physicists work 24 hours a day. Since December 7, 1941 this little furnace and its crew have been developing new steels with which to destroy the Axis and protect the lives of our sons, our husbands, our fathers, our brothers in the armed forces.

Skilled steel workers in the J&L plants eagerly take over new developments of the Pilot Plant and apply them to producing new war steels—millions of tons a year. Working shoulder to shoulder with mill metallurgists are men whose fathers and their fathers before them for a century have been the backbone of steelmaking in America. Month after month these men establish new production highs, make world records, then break them again and again.

Axis feeling effects of U. S. research. Today enemy forces on land, at sea and in the air are feeling the destructive effects of our armed forces equipped with the products of American ingenuity in making materials of war, with more to come. At the same time our fighting men are getting a tremendous lift from the security of bombers that return safely, of tanks that aren't pierced, of ships that won't go down.



# News of Industry

• • •

## Rosenwald Hits at Statements about Scrap Inventories

Pittsburgh

• • • Another hat was thrown into the scrap controversy ring this week when Lessing J. Rosenwald, director, Conservation Division, WPB, charged that recent statements concerning the size of scrap inventories as well as reports that some mills are so comfortable they are turning down material from recent scrap drives, may seriously affect the government's drive to build up a substantial inventory by Jan. 1, 1943.

"The government's main purpose in sponsoring scrap drives which have been aided considerably by newspaper publicity was to build, if possible, by Jan. 1, 1943, a scrap inventory backlog throughout the country of approximately 7,000,000 tons," Mr. Rosenwald said.

"Statements such as that released by E. C. Barringer, president and executive secretary of the Institute of Scrap Iron & Steel, recently to the effect that mills are not taking in the type of scrap which they freely accepted a month or so ago and are being choosy about what material they do accept, are particularly unfortunate in view of the government's drive to keep scrap flowing for the duration," Mr. Rosenwald said. He stated that scrap obtained from drives is being accepted by mills as fast as it can be prepared and added, "there was on Oct. 31, a stock pile of scrap of approximately four and three-quarter million gross tons at the plants of consuming mills. This leaves approximately two and a quarter million tons of scrap over and above current consumption requirements needed to bring the country's in-



British Press Service

ACH, AACHEN: Bomb damage inflicted on the west German town of Aachen is shown in the above photograph. (This picture was released by the Nazis because it shows only damage to civilian property in R.A.F. raids.)

ventory up to the 7,000,000-ton goal set by the government. Since much or practically all of the recently gathered scrap from public drives had not reached the mills by Oct. 31, there is a fair chance that inventories as of Jan. 1, 1943, may approximate 7,000,000 tons."

Rosenwald claimed that the need for scrap collections should continue for the duration and warned that the 24,000,000 tons of purchased scrap which will be needed in 1943 will be much more difficult to obtain than was the case in 1942. For this reason, he said, an extremely large inventory at steel mills is necessary in order to eliminate even the remotest possibility of a tight scrap situation in 1943 when war requirements

will be even more urgent than in 1942.

Estimating 1943 scrap requirements, Mr. Rosenwald said that probably less actual purchased scrap will be collected in 1942 than in 1943 providing the 7,000,000-ton inventory mark is reached by the first of the year. The cleaning up of accumulations throughout the country from households and farms, as well as the dwindling supply from automobile graveyards, plus the transportation difficulties and elimination of WPA makes the scrap picture far from rosy and requires the same type of support from the public and industry as has been given in the past several months, Mr. Rosenwald said.

YOU CAN DO IT WITH

U.S. DEPARTMENT OF



WAR DEPARTMENT  
ARMY AIR FORCES  
MATERIEL CENTER  
OFFICE OF THE DISTRICT SUPERVISOR  
CENTRAL PROCUREMENT DISTRICT  
8505 W. WARREN AVE.  
DETROIT, MICH.

July 13, 1942

PRODUCTION SECTION  
CENTRAL PROCUREMENT DISTRICT  
MANUFACTURERS' LETTER NO. 10  
CHICAGO AREA OFFICE

Cemented Tungsten Carbide for Cutting Tools

SUBJECT:

Cemented Tungsten Carbide for Cutting Tools

1. The following is quoted from memorandum, dated June 19, 1942, from the War Department, Headquarters. Services of Supply, Washington, D.C.:

"In the interest of conservation of critical alloys and of increased production, attention is directed to the following stated advantages of cemented tungsten carbide tools . . .

"a. One pound of tungsten in the form of cemented tungsten carbide for cutting tools will do the work of 70 to 100 pounds of tungsten in high speed tool steel. Furthermore, its use eliminates substantial amounts of chromium and vanadium which are considered necessary components of practically all high speed tool steel.

"b. Cemented tungsten carbide functions satisfactorily on almost all types of lathes and boring machines, particularly those of the sturdier construction. This is said to include all such machine tools manufactured in the last five years.

"c. Cemented tungsten carbide works efficiently on all steels above approximately .30 carbon and is effective up to 500 brinell or more.

"d. Cemented tungsten carbide will give two or three times the production of high speed tool steel in those operations to which its use is adapted and over a given run will require about one-fifth the number of grinds that standard high speed tool steel will require.

2. This information is forwarded by direction, Wright Field letter, EAZ-ar-72-2, (July 3, 1942).

3. Any requests for further information should be directed to the AAP Chicago Area Office, 20 N. Wacker Drive, Chicago, Illinois, Attention: Production Section.

For the District Supervisor:

HARLEY S. JONES  
Lt. Colonel, Army Air Forces  
Technical Executive

RECEIVED  
CENTRAL AIR CORPS PROCUREMENT DISTRICT  
OFFICIAL  
WAR DEPT.  
Distribution, 1-5  
1942 JUL 13, 1942  
in CPD

NOTE:  
In the reproduction of the above letter by Firth-Sterling, it is to be understood that it does not imply the WAR DEPARTMENT'S indorsement of any company's products.

YOU CAN DO IT WITH

# FIRTHITE

## TUNGSTEN - TITANIUM CARBIDES

### FOR STEEL CUTTING

**T-04\*** Universal grade for heavy duty, interrupted cuts, and coarse feeds, on older machines.

**TA\*** General-purpose grade for cutting steels under "average" conditions.

**T-16\*** The grade for fine, extremely fast machining of steel.

**T-31\*** Hardest, wear-resistant, premium grade for precision boring, etc.

\* **TITANIUM** in these FIRTHITE grades makes possible better, faster, cheaper cutting of steel and at the same time permits tool prices comparable with those for high-speed steel. These FIRTHITE grades are made under one or more of the following patents on **TITANIUM** Carbides: 1,925,910; 2,023,413; 2,246,387; 2,265,010; Re. 22,073; Re. 22,074; Re. 22,166; Re. 22,207.

## Firth-Sterling

### STEEL COMPANY

Offices: McKeesport, PA. NEW YORK - HARTFORD - PHILADELPHIA  
CLEVELAND - DAYTON - DETROIT - CHICAGO - LOS ANGELES

## Alloy Steel Output Up, Batcheller Says

••• Alloy steel production in October was 60 per cent higher than production in an average month of 1941, Hiland G. Batcheller, Director of the WPB Steel Division, said last week in an address before the National Association of manufacturers.

Speaking at the NAM's annual convention in New York City on "Steel to Beat the Axis," Mr. Batcheller pointed out that this gain in alloy steel production was achieved in spite of the fact that in the conversion of open hearth furnaces from the melting of carbon to alloy steel, the yield is cut by approximately one-third.

The October alloy steel production figure showed a gain of 400 per cent over the pre-war production peak. Mr. Batcheller declared that modern war is "a war of steel," and that the balance of power insofar as steel is concerned lies with the United States. Axis production of steel, he continued, exceeds by as much as 25,000,000 or 30,000,000 tons, the production of the United Nations, exclusive of the United States. However, the United Nations' steel output, counting the United States, exceeds that of the Axis by upwards of 50,000,000 tons.

The Steel Division director called attention to the fact that a problem similar to conversion of the manufacturing industries to the making of implements of war

has been faced and solved by the steel industry.

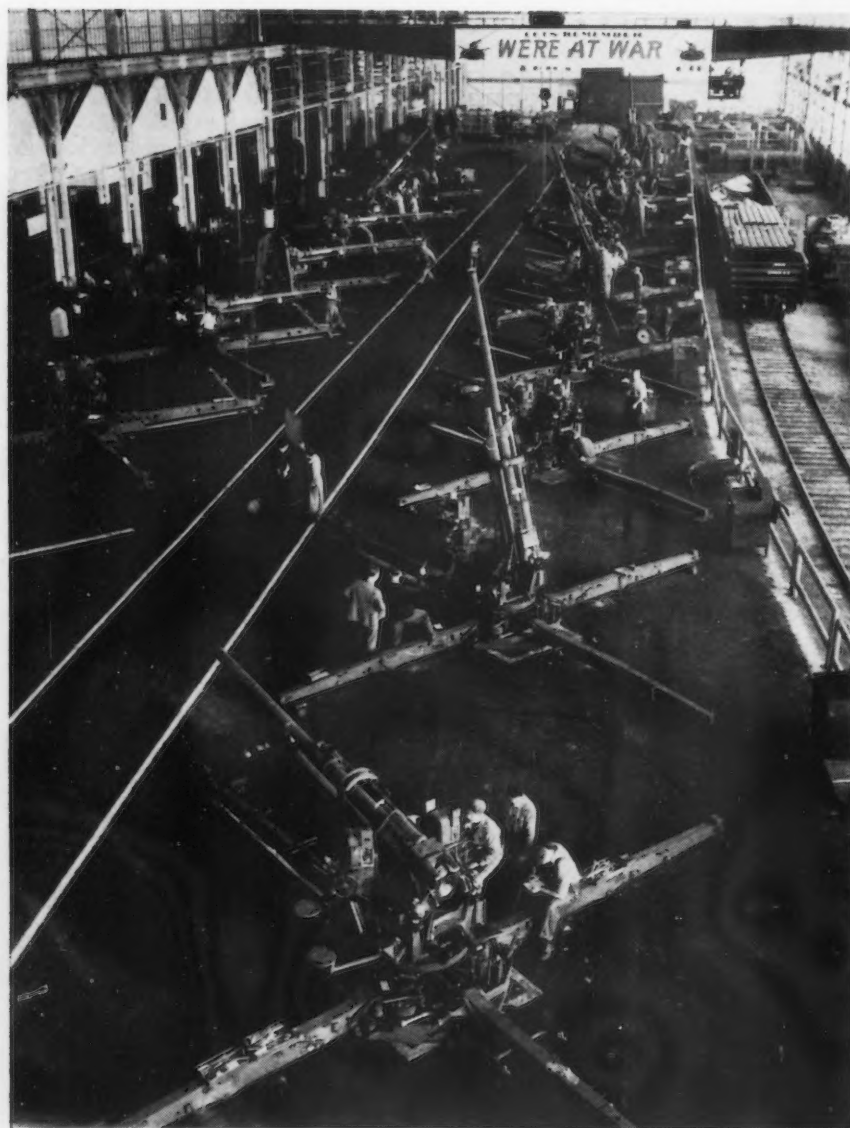
"In October 1941, steel plate production—the basis of our naval and commercial ship construction and of the tank program—amounted to 600,000 tons," he said. "In October 1942, 1,100,000 tons of plate were delivered—an increase of almost 100 per cent in this critical item.

"Only a minute fraction of this increase is due to newly constructed facilities; by far the greatest portion is the result of turning the huge continuous strip mills, the peace-time suppliers of the automotive and other industries, into the production of plates for ships, tanks and other military construction."

The Steel Division director pointed out that increased efficiency in production methods in other war industries and the ability of manufacturers to "beat their promises substantially and repeatedly" had complicated the steel supply problem.

90-mm. GUN ASSEMBLY: From this final assembly room at the Pontiac factory at Flint, Mich., these 90-mm. anti-aircraft guns are hauled away to be tested at proving grounds.

Press Association



## Boston Advertising Man Will Study British Methods

••• A study of methods used by British war plants to stimulate workers' enthusiasm for producing more goods will be made during the next few weeks by James T. Chirurg, president of the James Thomas Chirurg Co., Boston advertising agency, who is leaving for England.

Although Mr. Chirurg is traveling as a private citizen, his visit to England has been arranged with the cooperation of British government officials. His observations are expected to benefit war goods manufacturers in this country who are now facing situations and problems similar to those facing British manufacturers some months ago.

## Wickwire Spencer Buys Plant for Propellers

Chicago

••• Wickwire Spencer Steel Co. has recently acquired a plant in the Chicago area for the manufacture of its newly developed variable pitch fully automatic airplane propeller. The new plant is expected to begin operations shortly. The propellers are of a special wood construction and were described in THE IRON AGE, Dec. 3, 1942, p. 96.



*When the  
going  
gets  
tough!*

Use these  
**TOUGH  
FASTENINGS**

**BRASS**

**BRONZE**

**COPPER**

**EVERDUR**

**MÖNEL**

**STAINLESS**

Desert heat, tropic sweat, arctic sub-cold, ocean salt—they're all alike to tough Harper Fastenings.

That's why these versatile workers have been drafted for service in tanks, ships, planes—wherever fighting equipment has to fight rust and corrosion, extra stress and strain.

**WELL NAMED "EVERLASTING"**

Harper Fastenings—bolts, nuts, screws, washers, rivets and special items—are made only of brass, bronze, copper, Everdur, Monel or stainless steel.

**4320 STOCK ITEMS**

Harper Service is unique for the tremendous stock, including many hard-to-get items—and special machinery for turning out off-standard items with unusual speed.

**A REFERENCE ESSENTIAL**

Harper's Catalog is actually an invaluable reference volume—80 pages, 4 colors, 193 illustrations, packed full of useful data. Simply ask for it on your company letterhead.

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**HARPER** *Chicago*  
**EVERLASTING FASTENINGS**





Press Assoc. Inc. Photo

**THERE ARE NO STRIKES—?** Hundreds of striking employees are shown milling around the South Portland Shipbuilding Corp. at South Portland, Me., in spite of labor's no-strike pledge to the President. This walkout which occurred Dec. 1, almost on anniversary of Pearl Harbor, was caused by a wage dispute.

## McNutt Named Manpower Czar, Draft and Enlistment Limited

Washington

••• Creation of a virtual manpower "czar" within the War Manpower Commission having broad powers over the nation's manpower and Selective Service was accomplished by a Presidential order issued Dec. 5, naming Paul V. McNutt to this important post. This came as a surprise move following the breakdown of plans to appoint Secretary of the Interior Ickes, as Secretary of Labor heading a reorganized Labor Department which would have included the WMC.

Coupled with this move the President ordered a halt to all voluntary enlistments of men between the ages of 18 and 38 and the War Department suspended the induction of all men 38 years or older. Regulations to follow will soon put all men between the ages

of 38 and 44 in a new classification to be known as 4-H which will carry with it practically permanent deferment probably on the provision that the individual engage in direct war production.

Specifically the Presidential order invests these powers in McNutt and accomplished the following:

1. The Selective Service is placed under full control of McNutt and is coupled with the War Manpower Commission.

2. Wide control of hiring (which may mean a universal war plant hiring agency) is invested in McNutt through the functions of the United States Employment Service.

3. The order stops voluntary enlistments in the Army and Navy and definitely limits the induction of men of 38 or over.

4. It gives McNutt exclusive

**PEACE CONFERENCE OF UNIONISM:** With John L. Lewis playing the part of "the little man who wasn't there," delegates from CIO and AFL met this week in Washington to bring about organizational peace. Left to right are: R. J. Thomas, CIO; Julius Emspak, CIO; Phillip Murray, chairman, CIO; Harry C. Bates, AFL; William J. Hutcheson, AFL; and Daniel J. Tobin, AFL.

Harris &amp; Eving Photo



charge of training workers for vital industries.

5. It gives McNutt a place on the Economic Stabilization Board thus closing this gap between OES and WMC.

6. It places all officials having to do with manpower on the War Manpower Commission, thus centralizing these powers and operations.

The Presidential action maintains Mr. McNutt as Federal Security Administrator and director of the War Manpower Commission, titles which have been his for some time. Only his powers are extended, as his salary will remain the same, according to the letter of notification written to McNutt by the President.

Investment of power over the Selective Service in the War Manpower Commission came as a slight surprise as this action has been contemplated for some time. Maj. Gen. Lewis B. Hershey is expected to continue as director of Selective Service under WMC control and will function under the supervision of McNutt. Orders for the relationship between the Army and Navy and the WMC have already been given out by the President.

The War Manpower Commission under McNutt is also instructed to absorb all of the Army and Navy training programs in non-federal institutions and to integrate the training programs under the direction of the commission.

McNutt has been empowered to appoint a management-labor policy committee drawn from labor, agriculture and industrial management for purposes of consultation and to appoint other committees from government or private groups or both at his discretion. His new powers are sweeping in scope for carrying out his duties, subject to appeal to the President or to such agency or agent as the President may designate.

### Union Disciplined in Alcoa-WLB Decision

Cleveland

••• The WLB withheld a union security clause for 60 days as a disciplinary measure, ordered appointment of an arbitrator agreeable to the company and union and at the same time granted a 72c. minimum wage to women workers in plants of the Aluminum Co. of America this week.

Demand for appointment of an  
(CONTINUED ON PAGE 100)



# DELIVERY!

## RE: ARCOS CHROMANG ELECTRODES FOR WELDING ARMOR

ARCOS gives only firm delivery dates because each Arcos promise is based upon carefully scheduled production. When you order Chromang you receive your electrodes on time.

**ARCOS CORPORATION**  
401 N. Broad St., Phila., Pa.



*it's*  
**ARCOS**  
*for stainless electrodes*

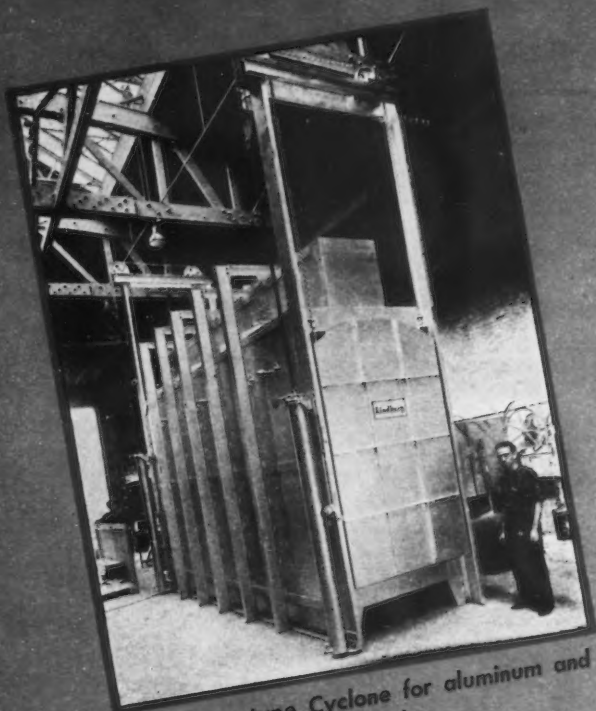
**"QUALITY WELD METAL EASILY DEPOSITED"**

Distributors Warehouse Stocks in the Following Cities:

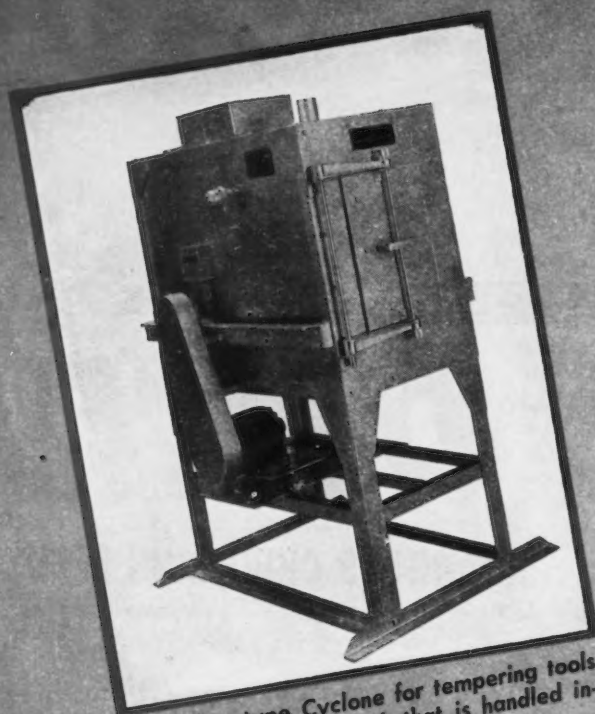
BUFFALO, N. Y. . . . .	Root, Neal & Co.	KINGSPORT, TENN. . . . .	Slip-Not Belting Corp.
BORGER, TEXAS . . . . .	Hart Industrial Supply Co.	LOS ANGELES, CALIF. . . . .	Victor Equipment Co.
BOSTON, MASS. (Belmont) . . . . .	H. Boker & Co., Inc.; W. E. Fluke	MILWAUKEE, WIS. . . . .	Machinery & Welder Corp.
CHICAGO, ILL. . . . .	Machinery & Welder Corp.	MOLINE, ILL. . . . .	Machinery & Welder Corp.
CINCINNATI, OHIO . . . . .	Williams & Co., Inc.	NEW YORK, N. Y. . . . .	H. Boker & Co., Inc.
CLEVELAND, OHIO . . . . .	Williams & Co., Inc.	OKLAHOMA CITY, OKLA. . . . .	Hart Industrial Supply Co.
COLUMBUS, OHIO . . . . .	Williams & Co., Inc.	PAMPA, TEXAS . . . . .	Hart Industrial Supply Co.
DETROIT, MICHIGAN . . . . .	C. E. Phillips & Co., Inc.	PITTSBURGH, PA. . . . .	Williams & Co., Inc.
ERIE, PENNA. . . . .	Boyd Welding Co.	ROCHESTER, N. Y. . . . .	Welding Supply Co.
FRESNO, CALIF. . . . .	Victor Equipment Co.	SAN FRANCISCO, CALIF. . . . .	Victor Equipment Co.
FT. WAYNE, IND. . . . .	Wayne Welding Supply Co., Inc.	SEATTLE, WASH. . . . .	Victor Equipment Co.
HONOLULU, HAWAII . . . . .	Hawaiian Gas Products, Ltd.	ST. LOUIS, MO. . . . .	Machinery & Welder Corp.
HOUSTON, TEXAS . . . . .	Champion Rivet Co. of Texas	SYRACUSE, N. Y. . . . .	Welding Supply Co.
KANSAS CITY, MO. . . . .	Welders Supply & Repair Co.	WICHITA, KANSAS . . . . .	Watkins, Inc.



# THIS IS ABOUT THE SIZE OF IT



Large box type Cyclone for aluminum and magnesium heat treatment.



Small box type Cyclone for tempering tools and dies or other work that is handled individually.



Large vertical type Cyclone for production tempering. Its accuracy of heating and control also makes it ideal for aluminum and magnesium heat treatment.



Small vertical type Cyclone Furnace for heat treating small parts. Note basket in lower right hand corner.

The accuracy and uniformity of heating is consistent throughout the entire range of sizes



SPECIFY STANDARD SIZES when ordering heat treating equipment. Valuable time is saved because drawings are available and all engineering has been completed. Man hours are saved by the elimination of special work in both engineering and the shop. And heat treating furnaces are sped to their destination to do their chosen work.

The dimensions listed below represent standard sizes of both vertical type and box type Lindberg Cyclone Furnaces. Each of these furnaces has been engineered and built and installed in the field.

The sizes embrace a range wide enough to handle practically any heat treating job for temperatures up to 1250°F.

## LINDBERG VERTICAL TYPE CYCLONE FUEL FIRED

Utilizes the famous Lindberg 100% forced convection heating principle, available in both fuel fired and electrically heated units. Work is handled in baskets or on fixtures for accurate,

uniform, low-cost tempering and precision heat treatment of aluminum and magnesium castings and forgings. Temperatures from 250°F. to 1250°F.

Dia.	Depth	Dia.	Depth	Dia.	Depth	Dia.	Depth	Dia.	Depth	Dia.	Depth	Dia.	Depth	Dia.	Depth
12"	16"	16"	36"	22"	72"	25"	160"	28"	72"	38"	28"	43"	48"	60"	72"
12"	100"	22"	26"	25"	20"	28"	28"	33"	28"	38"	30"	43"	54"	72"	24"
16"	20"	22"	30"	25"	30"	28"	36"	33"	36"	38"	36"	48"	28"	74"	72"
16"	22"	22"	36"	25"	36"	28"	42"	33"	40"	38"	48"	48"	38"	74"	86"
16"	26"	22"	38"	25"	40"	28"	48"	33"	48"	38"	60"	48"	48"	100"	44"
16"	28"	22"	48"	25"	48"	28"	50"	33"	60"	38"	72"	48"	60"	—	—
16"	32"	22"	60"	25"	60"	28"	60"	33"	72"	38"	84"	48"	78"	—	—

### ELECTRICALLY HEATED

Dia.	Depth	Dia.	Depth	Dia.	Depth	Dia.	Depth	Dia.	Depth	Dia.	Depth	Dia.	Depth	Dia.	Depth
8"	10"	16"	20"	22"	36"	25"	30"	28"	28"	33"	36"	38"	120"	48"	96"
8"	12"	16"	24"	22"	48"	25"	36"	28"	36"	33"	120"	43"	42"	60"	60"
10"	14"	16"	26"	22"	60"	25"	40"	28"	48"	38"	36"	43"	48"	60"	72"
10"	20"	16"	28"	22"	72"	25"	42"	28"	54"	38"	48"	48"	36"	60"	84"
12"	16"	16"	32"	22"	80"	25"	48"	28"	60"	38"	60"	48"	60"	60"	93"
12"	18"	16"	48"	22"	100"	25"	60"	28"	72"	38"	72"	48"	72"	—	—
12"	20"	22"	26"	25"	20"	25"	66"	28"	84"	38"	84"	48"	84"	—	—

## LINDBERG BOX TYPE CYCLONE FUEL FIRED

Is also heated by 100% forced convection and is also available in both fuel fired and electrically heated units. Recommended for tempering tools or dies or other work that is handled individually. Its heating accuracy and control make the box

type Cyclone ideal for heat treating aluminum and magnesium castings, stampings and forgings. Temperatures from 250°F. to 1250°F.

Width	Depth	Height	Width	Depth	Height	Width	Depth	Height	Width	Depth	Height
12"	16"	18"	24"	48"	18"	36"	36"	24"	48"	12'	60"
15"	24"	18"	24"	24"	20"	36"	54"	30"	54"	72"	36"
17"	24"	18"	30"	48"	40"	36"	72"	30"	60"	96"	42"
18"	36"	18"	30"	48"	48"	36"	72"	36"	72"	12'	42"
24"	24"	18"	30"	72"	24"	36"	92"	24"	—	—	—
24"	36"	18"	36"	22"	24"	42"	72"	36"	—	—	—

### ELECTRICALLY HEATED

Width	Depth	Height	Width	Depth	Height	Width	Depth	Height	Width	Depth	Height
12"	16"	18"	24"	48"	18"	42"	14'	36"	52"	84"	20"
12"	12"	10"	28"	28"	36"	48"	60"	30"	60"	60"	42"
15"	24"	18"	30"	30"	24"	48"	66"	48"	60"	10'	42"
15"	24"	24"	33"	34"	30"	48"	72"	30"	60"	10'	60"
15"	30"	18"	36"	36"	24"	48"	72"	36"	60"	16'	60"
15"	48"	18"	36"	48"	24"	48"	72"	48"	66"	15'	66"
18"	36"	18"	36"	54"	30"	48"	72"	60"	66"	16'	76"
20"	24"	18"	36"	72"	24"	48"	96"	36"	66"	25'	76"
20"	30"	18"	40"	96"	24"	48"	10'	72"	72"	96"	84"
20"	36"	18"	42"	16'	36"	48"	12'	72"	72"	12'	42"
24"	24"	18"	42"	16'	66"	48"	16'	72"	84"	96"	72"
24"	36"	18"	42"	72"	36"	48"	18'	72"	—	—	—
24"	36"	30"	42"	84"	42"	48"	22'	66"	—	—	—

L I N D B E R G   E N G I N E E R I N G   C O M P A N Y  
2 4 5 2   W E S T   H U B B A R D   S T R E E T   •   C H I C A G O

HYDRYZING FOR SCALE-FREE AND DECARB-FREE HARDENING

**L I N D B E R G   F U R N A C E S**

SUPER-CYCLONE FOR HARDENING, NORMALIZING, ANNEALING, TEMPERING, NITRIDING



**A leading  
furnace manufacturer  
says:**

**"Following a test, we now use  
'SILVER STREAK' DISCS  
EXCLUSIVELY for grinding  
welds and smoothing seams"**

Eager, as no doubt *you* are, to speed up grinding and get better results at less cost, this company ran a test on "Silver Streak" Abrasive Discs. Results tallied exactly with what other users have found. AP's exclusive insulating process makes "Silver Streak" Discs cut faster, more uniformly. They stay *sharp, cool, and on the job longer*, even when temperatures go up to 1700° ... a killing heat for many abrasives!

Make a test! Try this radically different abrasive on your jobs. There are AP abrasive cloths, belts and discs for every type of grinding and finishing. We'll supply samples **FREE**. That's how confident we are of "Silver Streak" performance. Tell us your toughest abrasive-using problem. Write today! Abrasive Products, Inc., 535 Pearl Street, South Braintree, Massachusetts.

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## MANPOWER

arbitrator coupled with the 60-day withholding of the union security clause was imposed on the local plant as a disciplinary measure in retaliation for the strike which occurred from Sept. 21 to 27. The union involved is the Mine, Mill and Smelter Workers, Die Casting Div. CIO.

The 72c. minimum wage decision was effective in the Alcoa plant at Vernon, Cal. The order demanded the same minimum pay for men and women, a point which the union and management had disagreed upon. The union had demanded equality for women workers and was upheld by WLB.

### Discharged Workers To Get Retroactive Pay

• • • The WLB has resolved that workers who have been discharged or have quit their jobs after the retroactive date of a wage increase ordered by WLB are entitled to the amount of the increase from the retroactive date of the increase until the time of termination of their services with the employer.

There is one important condition. The employee must make application for his increase to the employer within 60 days after the date of the board's order in the case. The application must be in writing. This 60-day limitation does not apply to men whose services with the company were discontinued through enlistment or draft into the armed services.

**PAGE McNUTT:** A partial solution to the manpower problem in the cotton industry is offered in this mechanical cotton picker developed by the International Harvester Co. of Chicago. The driver, sitting high and handsome, merely goes down the rows and the cotton is swooshed into the bin ready for ginning and baling.





### Hourly Steel Pay Advances to \$1.09

••• Steel companies are paying their employees 13 per cent more in direct wages per ton of products turned out by the employees than they did a year ago, it is revealed in a recent study by the American Iron and Steel Institute. In September of this year, the steel industry's wage earners were paid an average of \$16.71 for every ton of pig iron and steel products shipped to consumers. That compares with wage payments of \$14.72 per ton of products shipped in September 1941. The prices at which iron and steel products are sold have remained unchanged over the period.

A wage increase effective in the summer of this year, and more overtime pay are responsible for most of the rise in labor cost per ton of output. Average hourly earnings of wage earners increased from 98.2 cents per hour to nearly \$1.09 per hour from September 1941 to September of this year.

### WLB Hands J&L "Big Steel" Decision

Washington

••• With the dissent of two employer members, the National War Labor Board, on Wednesday of last week by a 4 to 2 vote ordered the Jones & Laughlin Steel Corp. to conform to the provisions of the Board's United States Steel Corp. decision making its agreement with CIO's United Steelworkers.

The Board said that four plants, with approximately 30,000 employees, are affected. At the same time, the Board rejected J & L's proposal that a penalty clause be included in the contract, permitting the company to collect a fine of \$1 from each union member for each day or part of a day he participated in a strike.

The panel majority said that the company's penalty clause was not an appropriate technique for eliminating or decreasing work stoppages.

The maintenance-of-membership clause, permitting employees 15 days from Nov. 30 in which to withdraw from the union if they do not desire to be bound to remain members for the contract's duration and have their dues checked off was ordered included in the agreement.



## The Original Self-Locking Nuts

with the RED Locking Collar

THAT REVOLUTIONIZED  
AIRCRAFT  
PRODUCTION

## ...NOW STEPPING UP WAR DELIVERIES

- 1. They save the worker's time**  
Each nut is a self-contained easy-to-handle unit that goes on fast... and its self-locking action is immediate and automatic.
- 2. They eliminate the dangers of careless assembly**  
The locking element is built into the nut... no pins, wires, washers, or shims that can be forgotten or incorrectly applied.
- 3. They reduce inspection needs**  
With less operations and less parts to be checked... there's another important saving in man-hours.

There are more Elastic Stop Nuts on America's airplanes, tanks, guns, Naval vessels, and production equipment, than all other lock nuts combined.

» Write for folder explaining fully the Elastic Stop principle

**ELASTIC STOP NUT CORPORATION**  
2368 VAUXHALL ROAD • UNION • NEW JERSEY





**I**N the arsenals of war production, "Yankee" Fine Mechanics' Tools save time, work, trouble and money — not merely because good mechanics use them, but primarily because the predetermined ingenuity of these tools makes good mechanics better! They speed up production because they are *made for speed* . . . because they are designed to do their jobs fast and with ease.

Behind "Yankee" Tools are more than a half century of precision manufacture, accurate testing and a determination to produce true quality and dependable performance. Perhaps this is why war-time demand is now so much greater than our capacity to produce.

We'll do our best to meet your needs. You can help us by providing priority ratings whenever possible. Order from your supply house or write to us . . . c/o Dept. IA 12.



"YANKEE" VISES  
Four Handy Sizes with Swivel Base. V-block holds round stock securely.

# "YANKEE" TOOLS

make good mechanics better  
North Bros. Mfg. Co., Phila., Pa., U. S. A.  
Established 1880

## MANPOWER

### President's Overtime Order Clarified

Washington

• • • The leading questions and limitations of the President's recent order affecting overtime pay were clarified somewhat this week in a statement by the WPB.

The purpose of the order was said to have been aimed at facilitating production on a round-the-clock basis by reducing absenteeism resulting from premium pay on Saturday and Sunday; to enable employers to produce on Saturday and Sunday without the handicap of penalty rates and to obtain a broader application of the principle of one day's rest in seven for the sake of health and efficiency.

The order does not abolish overtime pay for Saturday and Sunday when these days occur as the sixth or seventh consecutive work day. It does, however, demand double time for the seventh consecutive day of work, thus favoring the omission of this day by the employer to avoid penalty rates and assuring the employee of one day's rest in seven.

Overtime rates not to exceed time and one half are required for hours worked in excess of 8 per day, 40 hr. a week or on the sixth consecutive day wherever required by the Walsh-Healey Act, Fair Labor Standards Act or by collective bargaining agreement.

Inquiries concerning interpretations should be addressed to Irving J. Levy, Acting Solicitor, U. S. Department of Labor, Washington, D. C.



W-260-1/24

Drawn for Office of War Information

### President to Honor Suggestion Winners

• • • The top ranking six men out of 20,000 production soldiers who have submitted production improving ideas and won the War Production Drive's individual merit awards will be honored by President Roosevelt on Dec. 10 at the White House.

The winners will be presented with the Citation of Individual Production Merit by the President, the highest honor conferred by the WPB for individual achievement in war work.

### Steel Payrolls Reach New Peak of \$126 Million

• • • Payrolls totaling a record-breaking \$126,627,000 were distributed by companies in the steel industry during the month of October, the American Iron & Steel Institute announced Dec. 4.

The total paid out in October exceeded by nearly \$2,000,000 the previous peak of \$124,777,000 disbursed to steel employees in September of this year. In October, 1941, steel payrolls were \$118,890,000.

Continuing the trend of the past several months, the number employed in the steel industry declined during the month.

A total of 635,000 employees were on the payrolls during October, as against 640,000 in September and 646,000 in October a year ago.

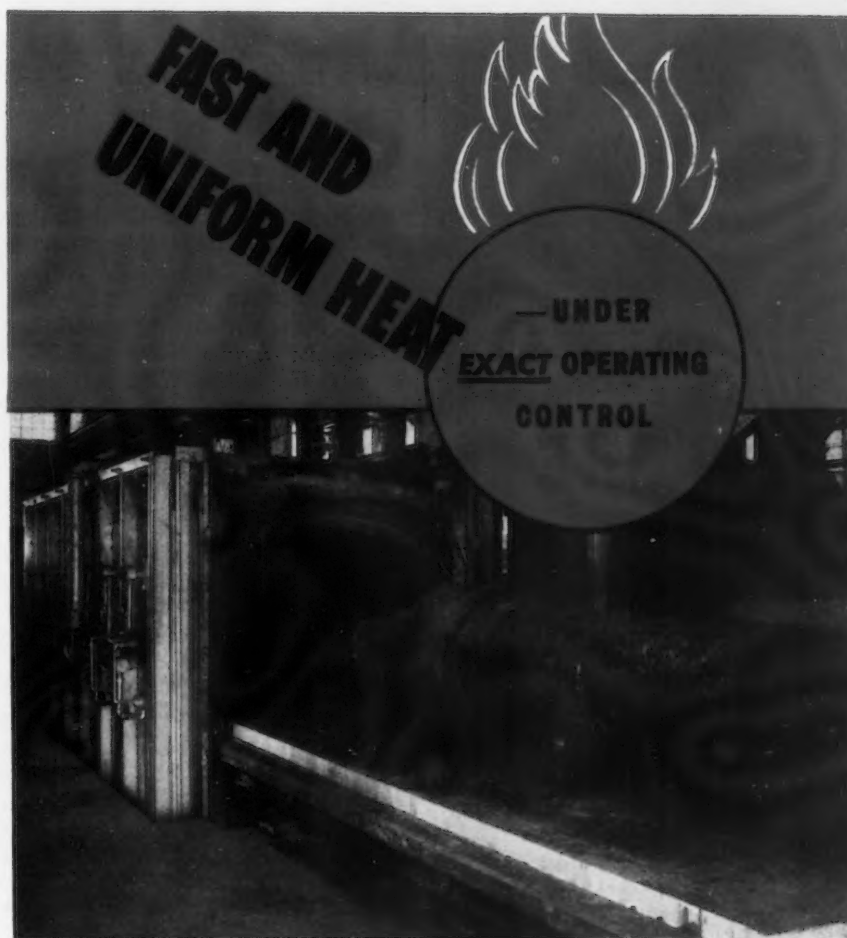
Wage-earning employees in the industry earned an average of 107.7 cents per hour in October, compared with 108.6 cents per hour in September and 98.3 cents per hour in October, 1941.

An average of 39.9 hours per week was worked by wage earners in October, as against 39.8 hours per week in September and 40.0 hours per week in October of last year.

### Personnel Learns Chemistry As Rubber Plant Is Built

Pittsburgh

• • • Faced with a shortage of semi-skilled workers to operate the big synthetic rubber plant it is now building, the Koppers Co. is recruiting several hundred men and women to attend chemistry classes and do laboratory work.



*Delivered day in  
and day out by*

# SWINDELL

## HIGH TEMPERATURE CAR-TYPE FURNACES

—on scores of war production assignments where performance *must* be right!

LET US  
CONSULT  
ON YOUR  
PRESENT  
FURNACE  
PROBLEMS

**SWINDELL-DRESSLER Corporation**  
DESIGNERS AND BUILDERS OF MODERN INDUSTRIAL FURNACES  
PITTSBURGH, PA.

# G. A. WELDING Shop Notes

## UP SHE GOES!

Making steel plate equipment is only part of the service offered by General American's Plate and Welding Division. Veteran crews of erection men are maintained in various parts of the country to make certain that the finished job is set up properly. This final step completes the cycle of precision manufacturing—from engineering through fabricating, stress-relieving and testing—to assure you of 100% value on every "Fluid-Fusion" Welded Vessels.

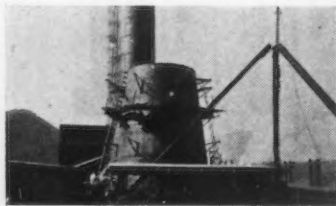


PLATE AND WELDING DIVISION  
**GENERAL AMERICAN  
TRANSPORTATION**  
CORPORATION



104—THE IRON AGE, December 10, 1942

## WPB to Control War Production Scheduling

Washington

• • • Details of the settlement of the dispute between Gen. Brehon B. Somervell, Chief, Services of Supply, and Donald M. Nelson, WPB Chairman, were not revealed in a joint statement issued last Friday by Army, Navy and WPB setting forth the WPB authority over scheduling.

However, WPB will exercise general supervision of the scheduling of the programs between the various services to see that they do not conflict, and that they are of such a nature that they may be performed in accordance with the requirements of the Joint Chiefs of Staff and of the total war program. The scheduling duties have been delegated to Charles E. Wilson, WPB Production vice-chairman.

In addition to these duties Mr. Wilson is charged with the particular duty of central supervision and direction of the production programs of aircraft, radio and detection equipment and escort vessels. He will exercise these duties through the supply and pro-

curement branches of the services.

While Mr. Wilson has authority to inquire into any feature of the production program and to consult on production matters with officials of the services or any producer, he will issue his directions through the supply services of the Army, the Navy and the Maritime Commission.

The following is the joint statement of Secretary of War Stimson, Secretary of Navy Knox and Donald M. Nelson.

Conversations among officials of the armed services and of the War Production Board on the organizational plans necessary for achieving the 1943 war production program have now ended with full agreement by all concerned.

"Such questions as have arisen had to do with method; never with purpose of principle. To win the war quickly, effectively and with the lowest expenditure of life, is everybody's goal. From time to time reexamination of the plans and methods for achieving that result is necessary. That has been done. The new arrangements give assurance that the immense production task for 1943 will be carried through to a successful conclusion."

**BRITISH ASSEMBLERS:** British women, to a large extent, are building the new Churchill tanks working with the newly formed Royal Electrical and Mechanical Engineers. Here these A.T.S. girls are shown just as a turret is being lowered into place for assembly.

British-Combine Photo







*and now....*  
**A LINE OF SPECIAL  
 "Detroit"  
 HIGH PRECISION  
 TAPPING MACHINES**

*At Left—*

Series LTM Light  
 Duty High Pre-  
 cision Tapping  
 Machine

*At Right—*

Series HTM  
 Heavy Duty Pre-  
 cision Tapping  
 Machine

Intermediate  
 Sizes also  
 available.



*With such features as:*

- Spindle nose guided during entire stroke
- Lead-Screw driven at bottom, eliminating inaccuracies due to "wind-up"
- Available with single or multiple tap heads
- Automatic reverse and return stroke
- No end play in tap spindle

For complete details write for Bulletin No. TM-43



**DETROIT TAP &**

**TOOL** *Company* 8432 BUTLER  
 DETROIT



**A** adjustments in fractions of thousandths is a commonplace occurrence with Grand Rapids Hydraulic Feed Surface Grinders.

After coarse adjustment of the large hand wheel to approximate grinding position, the Vernier dial gives minute vertical changes of the head—a complete revolution gives .012 of travel; twelve divisions of the Vernier, spaced  $\frac{1}{8}$ " apart, give .0001 or fractions thereof.

For precise surface grinding, quickly done, install "Grand Rapids."

Send for Bulletin GL10

**GALLMEYER & LIVINGSTON CO.**

200 STRAIGHT AVE. S.W.

GRAND RAPIDS, MICHIGAN

### Ore Shipping Season Being Stretched on Lakes

••• With the 1942 iron ore movement on the Great Lakes already well above the 91,000,000-ton mark, Director Joseph B. Eastman of the Office of Defense Transportation announced Dec. 3 plans for stretching the shipping season well into December with the hope of exceeding the latest WPB goal of 91,500,000 tons.

Eastman praised the carriers and vessel crews for their contribution to war production, pointing out that the expansion of steel mill capacities this year would have been useless if the carriers had not bettered all previous efforts to supply the blast furnaces with ore.

Because of winter weather, which already has hit the Lakes, insurance rates and operating costs soar after the normal season closes, about Nov. 30. Insurance rates on the ore rise every five days after that date. ODT has arranged with the War Shipping Administration for the handling of the post-season insurance and with OPA for the increase in shipping rates on ore to meet the higher costs. WSA will cover the post-season ore reinsurance, while OPA

will permit a 31.25 per cent increase in the ore rates. The rate advance is expected to cover only the carriers' additional out-of-pocket costs of December operation.

With these two measures, said Mr. Eastman, the ODT hopes to make possible the movement of enough additional ore in December at least to meet the minimum requirement of 91,500,000 tons for the season. Under pressure from constantly mounting iron requirements from the blast furnaces and steel mills, the carriers moved 91,338,000 gross tons of ore as of Sunday, Nov. 29.

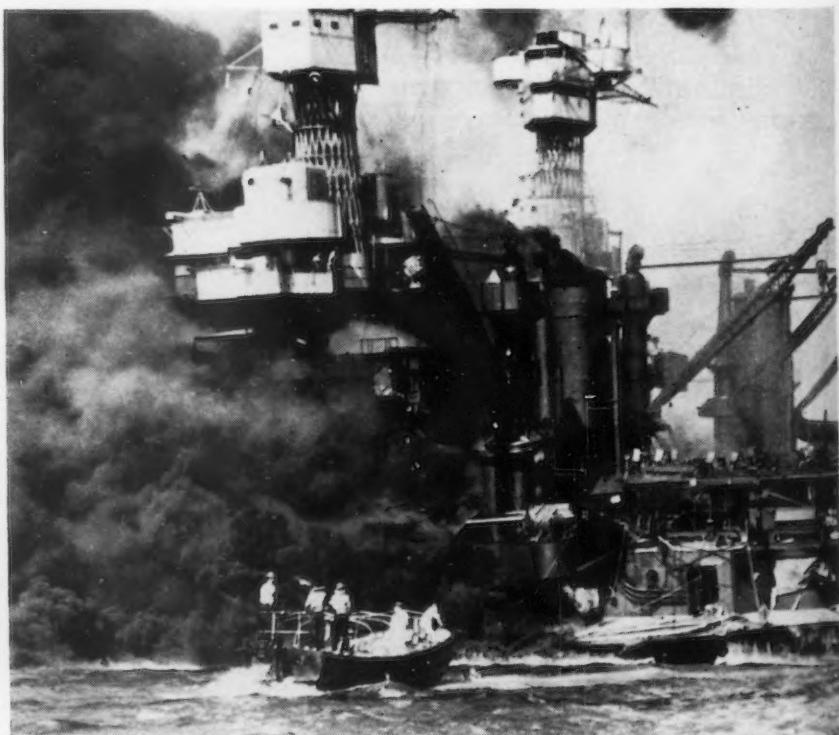
### WPB Appoints Knoizen

Washington

••• Arthur S. Knoizen has been appointed Director of the WPB Mining Equipment Division. Mr. Knoizen is on leave of absence from the Joy Mfg. Co., makers of mining machinery, Franklin, Pa., of which he is vice-president. Mr. Knoizen succeeds Dr. Wilbur A. Nelson, formerly director of the division, who has been assigned to staff duties in the Office of the Director General for Operations.

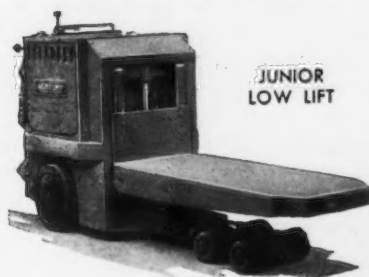
**PEARL HARBOR REMINDER:** These are battleships of the U. S. fleet resting on the bottom of Pearl Harbor after the treacherous Jap attack last Dec. 7. Foreground ship is the U.S.S. West Virginia. Behind it can be seen part of the U.S.S. Tennessee.

U. S. Navy Photo from Acme

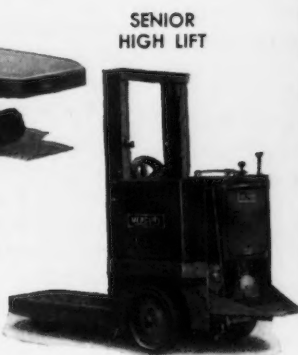




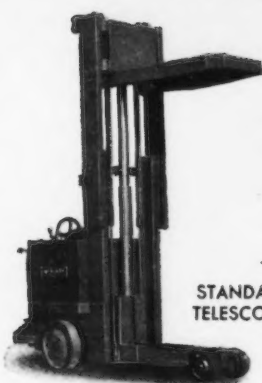
## PLATFORM TRUCKS



JUNIOR  
LOW LIFT



SENIOR  
HIGH LIFT



STANDARD  
TELESCOPIC

# MERCURY APPROVED MODELS

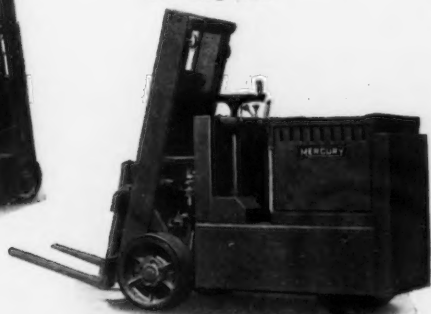
*under*

WAR PRODUCTION BOARD  
LIMITATION ORDER L-112

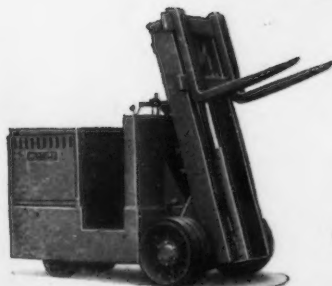
	JUNIOR LIFT			SENIOR LIFT			STANDARD LIFT		
MODEL	A-1007	A-1006	A-1005	A-1017	A-1018	A-1019	A-1020	A-1001	A-1003
CAPACITY (O.A.)	4,000	4,000	4,000	4,000	4,000	4,000	6,000	6,000	6,000
PLATFORM LENGTH	48"	48"	48"	54"	54"	54"	54"	54"	54"
" WIDTH	20"	20"	20"	26½"	26½"	26½"	26½"	26½"	26½"
FROM A HEIGHT	7"	7"	7"	10¾"	10¾"	10¾"	11"	11"	11"
TO A HEIGHT	18"	67"	115"	23"	62"	113"	23"	62"	113"

## FORK TRUCKS

MODEL A-1360 MERCURY  
"JEEP" TILTING TIERING  
FORK TRUCK  
Capacity 2,000 lbs.  
36" long load



MODEL A-1480  
STAND UP CENTER  
CONTROL FORK TRUCK  
Capacity 4,000 lbs.  
36" long load



MODEL A-1540  
Capacity 6,000 lbs.  
36" long load

## TRACTORS • TRAILERS



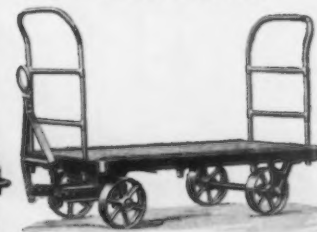
ELECTRIC "TUG"  
MODEL A-540  
NORMAL D.B.P. 475-600 lbs.  
MAXIMUM D.B.P.  
2000-2500 lbs.



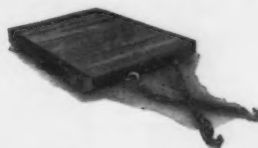
"BANTY" GAS TRACTOR  
MODEL A.A-440  
Maximum D.B.P. 2300 lbs.



STANDARD A-310 Trailer  
Capacity 4,000 lbs.  
Platform size 6'x3'x14¼" high  
Also available with dump body



STANDARD A-610 Trailer  
Capacity 4,000 lbs.  
Platform size 3'x6'x16½" high  
Also available with dump bodies



DOLLY  
Type A-401

# MERCURY

TRACTORS  
TRAILERS  
LIFT TRUCKS

MANUFACTURING COMPANY

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● For detailed information on Mercury approved models, write for attractive new catalogue. Included is helpful information on the approved procedure for ordering; an explanation of the application of each type of equipment, and detailed information on each model. Your copy sent free upon request.





## IF IT'S **SPEED** You Want!

Whether you are transporting materials or parts, there is no time for "slips" or breakdowns!

That's why many plants rely on Reading Electric Hoists like this to keep production up, and to keep maintenance time down. Reading Electric Hoists are engineered to stay on the job through every shift, day after day!

● "Modern Materials Handling Magic" is a new 16-page booklet full of facts about Reading Hoists and the ways they are helping to boost output and save man-hours. A note on your company letterhead will start your copy on its way.

**READING CHAIN & BLOCK CORP.**  
DEPT. D-13      READING, PA.



# READING

Chain Hoists, Electric Hoists,  
Cranes and Monorails

## NEWS OF INDUSTRY

### Blaw-Knox Awarded Engineering Job For Rubber Plants

*Pittsburgh*

• • • The Defense Plant Corporation, on the recommendation of the four leading rubber companies, has selected the Blaw-Knox Co. to prepare the fundamental engineering designs for the co-polymerization plants for the synthetic rubber program.

Blaw-Knox has been working on the engineering design for several months and through a subsidiary, Blaw-Knox Construction Co., is engaged in the engineering and construction of six plants for the manufacture of synthetic rubber from butadiene and styrene. These plants will have a total capacity of several hundred thousand long

tons a year, it was disclosed by an official of the company today.

Four of the plants are completely new installations, while two are additions to plants previously built by the company, and already in operation. The buildings are being erected by various contractors and Blaw-Knox will install the equipment in all the plants.

The largest of the new plants is an installation for the United States Rubber Co. Others are two plants for Firestone Tire and Rubber Co., and one for B. F. Goodrich Co.

The two plants being enlarged are having second units installed. These are a plant for Firestone, and another for United States Rubber Company. The first units at Firestone and United States Rubber are now operating.

**JAP DAMAGE REVEALED:** Wreckage of the U. S. destroyers Downes and Cassin in drydock at Pearl Harbor after the Dec. 7. surprise attack. Relatively undamaged is the U.S.S. Pennsylvania, flag ship of the Pacific fleet, shown in the rear.

*Press Assoc. Inc. Photo*



# HOMESTEAD LEVER-SEALD VALVES ARE STICK-PROOF

*and how!*



## WHY HOMESTEAD "LEVER-SEALDS" ARE BETTER VALVES

- ✓ Instant, positive, unfailing operation under all conditions.
- ✓ Quarter-turn of upper lever fully opens or closes valve.
- ✓ Positive sealing without lubrication.
- ✓ Seating surfaces protected in all positions.
- ✓ Straight-line fluid flow for unobstructed passage and minimum pressure drop.
- ✓ Sealed bottom and deep stuffing box prevent outside leakage.

Homestead Lever-Seald Plug Valves assure *continuous, never-failing* control at lowest cost.

They *always* work. Corrosive or viscous fluids, extremes of temperature and pressure, and similar conditions that cause ordinary valves to "stick," cannot make "Homesteads" inoperative.

Built into each of these valves is a powerful leverage (lower lever), which relieves seating pressure between plug and body just enough to overcome friction, and permit easy turning. Then a *quarter-turn* of the upper lever fully opens or closes the valve; and full seating pressure is again applied by the lower lever to make a positive leakless seal.

Thus, right on each Homestead Lever-Seald Valve, a part of it at all times, is the mechanism which makes possible continuous, unfailing, positive operation.

Homestead Lever-Seald Valves are made in semi-steel, steel, or bronze, sizes 1½" to 10", for pressure ranges from 150 pounds to 1500 pounds. Write for Valve Reference Book No. 38.

## HOMESTEAD VALVE MFG. CO.

P. O. BOX 23 • • • CORAOPOLIS • • • PENNSYLVANIA





## This NEW WAR PRODUCTION GAGE

—is helping 1400 war plants speed their output

Send for this **FREE** booklet showing many applications of the

## MICRO-CHEK

LESS FATIGUE, faster inspections, are speeding up the gaging of millions of precision parts in more than 1400 war plants which are now using the new Trico MICRO-CHEK.

Many big industries have installed scores of these new comparator gages as a result of testing out a trial instrument. They found these advantages:

1. Greater speed with no sacrifice of accuracy; 2. Faster reading, less eyestrain and fatigue on operators; 3. Original accuracy continuously retained by re-setting with original master parts; 4. Inexperienced workers quickly become accurate inspectors; 5. Special fixtures or anvils for holding parts to be inspected require less accuracy and cost less to make.

Multiplies dimensions by 200. Contact pressure adjustable between 2 oz. and 2 lbs.

**TRICO MICRO-CHEK**  
TRICO PRODUCTS CORP.  
33 Goodell Street  
Buffalo, N. Y.



Other Anvils Available:

... **Internal Type** for gaging internal details, adjustable to different sizes and depths of holes.

... **Thread-gaging Type** for pitch diameter and thread leads.

Braille **MICRO-CHEK** — for the blind — readable by finger touch.

## Army Fliers Dive Planes At 725 Miles Per Hour

Farmingdale

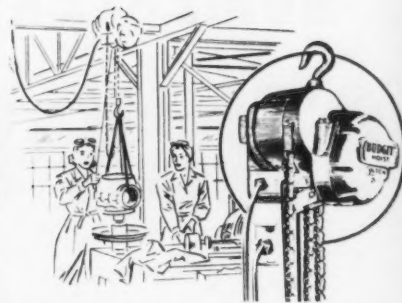
... On Nov. 15 at an east coast air base, two Army lieutenants, in Republic P-47 Thunderbolts, dived at 725 miles an hour, and probably became the first human being to hurtle through space at a speed greater than that of sound. During the dive the air pounded against the vertical control surfaces with such force that the flyers' joy sticks were frozen solid and both pilots resorted to the crank which controls the elevator trim tabs.

"When I rolled back on the tabs, the plane shuddered as though it had been hit by a truck," said one of the flyers. "Frankly, I wondered whether the tail section was still there, but the ship was as well knit as the Siamese twins."

## 84 Ships Delivered By Yards in November

... American shipyards striving to carry out President Roosevelt's directive calling for 8,000,000 tons of new shipping in 1942, moved a step nearer that goal by delivering into service 84 vessels totaling 891,700 deadweight tons in November, the Maritime Commission announced Dec. 2.

The month's output of completed ships raised the total production for the year to 625 vessels of 6,890,000 deadweight tons, leaving 1,110,000 tons to be delivered in December. The commission stated that its schedules for December indicate that the nation's shipyards will turn out the required tonnage.



## From the kitchen

WARTIME calls women from the home into the factory. Even with frail fingers and small strength she may work on heavy parts with a 'Budgit' Electric Hoist to do her lifting. Thus thousands of jobs are opened up to women who must now do the work of men.

'Budgit' Hoists are portable, electric hoists with lifting capacities of 250, 500, 1000 and 2000 lbs. They are priced from \$119 up. Hang up, plug in, and use. For complete information, write for Bulletin 348.



Send for catalog containing complete information on Hoists, also "Time Saving Calculator" that shows savings they earn.



**'BUDGIT' Hoists**

MANNING, MAXWELL & MOORE, INC.  
MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves, Consolidated Safety and Relief Valves and 'American' industrial instruments.



## Foundrymen Will Continue Apprentice Competition in '43

Chicago

••• The apprentice training committee of the American Foundrymen's Association has announced that it will continue its annual apprentice molding and patternmaking competition in 1943. The next contest to be held in connection with the convention of the association, scheduled for St. Louis, April 28, 29 and 30, is open to all indentured apprentices. Contests will cover four classes, gray iron molding, steel molding, non-ferrous molding, and patternmaking. The first, second and third prizes of \$30, \$20 and \$10 respectively in each of the four groups will be awarded to the winning entries if submitted from local competitions. Local competitions may be held by either individual foundries or pattern shops or by a group of foundries or local foundry association or chapter of the A.F.A.

The committee supervising the contents are: C. W. Wade, chairman, Caterpillar Tractor Co.; Frank C. Coch, Cleveland Trade School; H. L. Charlson, American Steel Foundries; J. Morgan Johnson, Tri-City Manufacturers' Association; J. G. Goldie, Cleveland Trade School; G. A. Zabel, Universal Foundry Co., and E. P. Meyer, Chain Belt Co.

The contest committee has arranged for distribution of copies of the regulations together with blueprints for the pattern contest and patterns for the molding contest. Any plant desiring to enter apprentices in this competition may obtain copies of regulations and other material through addressing the American Foundrymen's Association, 222 W. Adams Street, Chicago.

## New Chairmen Named for U. S.-Canadian War Board

••• Charles E. Wilson, vice-chairman of WPB, and Harry J. Carmichael, coordinator of production of Canada's Department of Munitions and Supply, have been appointed co-chairmen of the Joint War Production Committee of the United States and Canada. Mr. Wilson succeeds James S. Knowlson as American chairman and Mr. Carmichael succeeds G. K. Sheils as Canadian chairman. The committee was established Nov. 5, 1941.



*One man, one machine, one plant can*

*increase production tremendously when all movement of*

*materials is correlated with*

# TOWMOTOR



**THE 24-HOUR ONE-MAN-GANG**

**TOWMOTOR COMPANY • CLEVELAND**

THE IRON AGE, December 10, 1942—111

## Lincoln Foundation Sets Up Student Award Program

Cleveland

••• The James F. Lincoln Arc Welding Foundation of Cleveland, sponsor of the 1937-38 and 1940-42 nationwide \$200,000 arc welding award programs, has announced its first award program in the field of undergraduate engineering study. The foundation's new proj-

ect is the \$6,750 annual engineering undergraduate award and scholarship program. Its object is "to encourage engineering students to study arc-welded construction so that their imagination, ability and vision may be given opportunity to extend knowledge of this method and thus aid the war effort and the economic reconstruction in the peace which is to follow."

There are 77 student awards—a first award of \$1000, second of \$500, third of \$250, four awards of \$150, eight of \$100, twelve of \$50 and fifty of \$25. There are seven scholarships of \$250 each. The school of the first award winner will receive four scholarships totaling \$1000; the school of the second winner will receive two scholarships totaling \$500; and the school of the third winner will receive one scholarship of \$250. The contest runs from Dec. 1 to April 1, 1943.

Any resident engineering undergraduate student registered in any school, college or university in the United States, giving a course in any branch of engineering or architecture, leading to a degree, or any cadet registered in the United States Military Academy, United States Naval Academy and Coast Guard Academy is eligible to submit a paper in the award program.

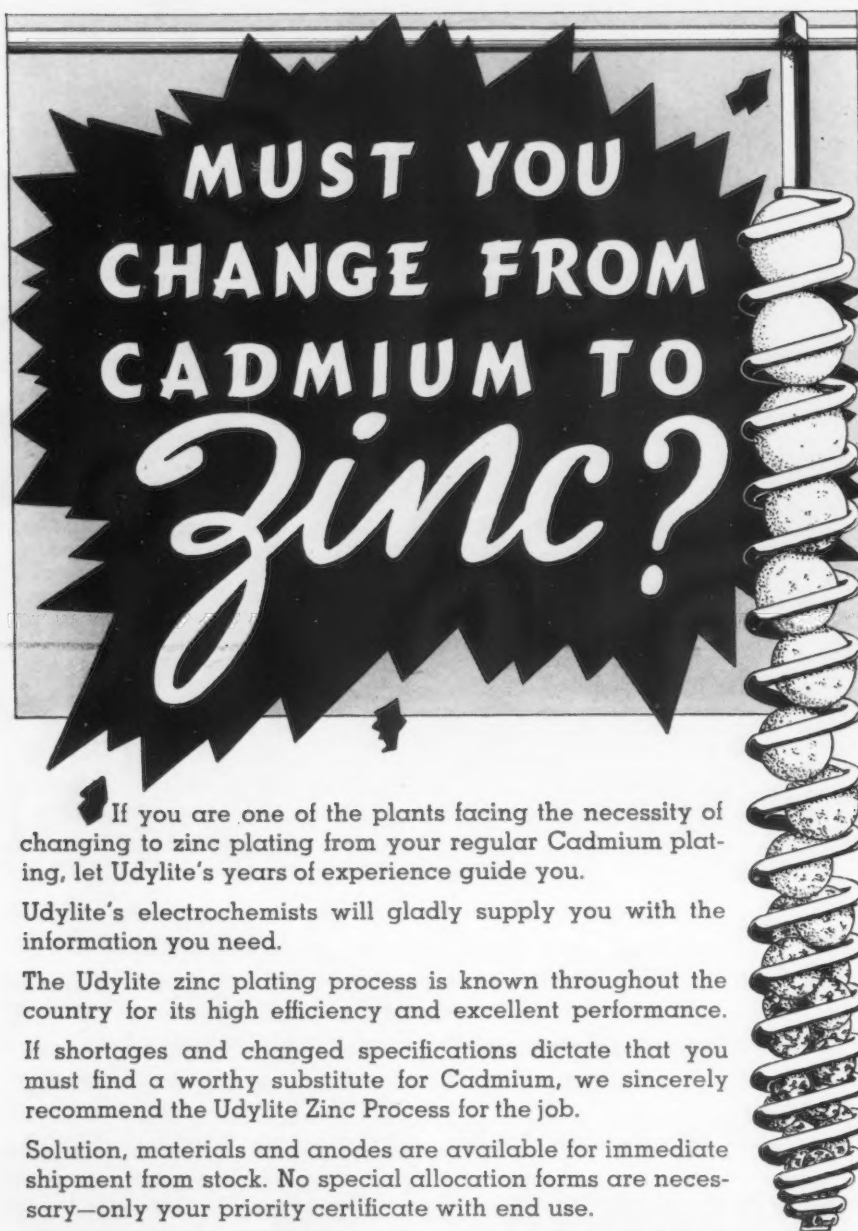
The awards will be made for papers describing the conversion from other methods to arc-welded construction of parts of machines, complete machines, trusses, girders or structural parts. The subject may be something which the student has observed in school shops, magazines, books, printed matter or elsewhere; or he may conceive of a product which has never been built but could be built by arc welding.

The jury of award will be drawn from various branches and institutions of engineering education. Selection of the jurors will be under the direction of Dr. E. E. Dreese, chairman of the board of trustees of the James F. Lincoln Arc Welding Foundation and head of the department of electrical engineering of Ohio State University.

Further details of the \$6750 Annual Engineering Undergraduate Award and Scholarship Program may be obtained by writing the James F. Lincoln Arc Welding Foundation, P. O. Box 5728, Cleveland.

## Rheem Launches First Ship

••• The first of 32 Liberty ships to be built at the Rheem Yards, Providence, was launched Nov. 28. The ship is of 10,500 tons. Keel was laid June 27, three months after ground was broken for construction of the yard.



**MUST YOU  
CHANGE FROM  
CADMIUM TO  
Zinc?**

If you are one of the plants facing the necessity of changing to zinc plating from your regular Cadmium plating, let Udylite's years of experience guide you.

Udylite's electrochemists will gladly supply you with the information you need.

The Udylite zinc plating process is known throughout the country for its high efficiency and excellent performance.

If shortages and changed specifications dictate that you must find a worthy substitute for Cadmium, we sincerely recommend the Udylite Zinc Process for the job.

Solution, materials and anodes are available for immediate shipment from stock. No special allocation forms are necessary—only your priority certificate with end use.

[Write for Technical Bulletin Z-1. It gives up-to-the-minute information on the change-over from cadmium to zinc.]

## THE UDYLITE CORPORATION

1651 E. Grand Blvd., Detroit, Mich.

Chicago  
1943 Walnut Street

Long Island City, N. Y.  
11-16, 44th Drive

Cleveland  
4408 Carnegie Ave.



Acme Photo

**EBERSTADT DENIES SECRETS:** Discounting charges arising from a bill presented by Senator Pepper for the technical mobilization of all U. S. industries, Ferdinand Eberstadt, program vice-chairman of WPB, denied that his agency had any knowledge of alleged secret meetings of steel company executives to prepare plans for the maintenance of their normal business.

### Air Cargo Engineering Discussed at Chicago

••• A two-day meeting on air cargo engineering was held this week in Chicago under auspices of the Chicago section of the Society of Automotive Engineers. Cooperating with the SAE in arranging the meeting were the Air Transport Association of America, the Aeronautical Chamber of Commerce and the U. S. Department of Commerce.

Speakers on Tuesday included: Col. Harold R. Harris, Army Air Force; Charles Froesch, Eastern Air Lines; Karl Larson, Northwest Airlines; A. W. Herrington, President of SAE; Com. C. H. Schildhauer, U.S.N.; C. G. Peterson, Railway Express Agency; J. Parker Van Zandt, Department of Commerce; R. D. Kelly, United Air Lines; W. B. Stout, Stout Skycraft Corp.; and J. V. Sheehan, Lockheed Aircraft Corp. Those who spoke Wednesday were: E. S. Evans, Evans Products Co.; H. D. Hoekstra, Civil Aeronautics Administration; Carlos Wood, Douglas Aircraft Corp.; Richard du Pont, All American Aviation, Inc.; and Major L. D. Barringer, U. S. Army Air Force.

### Steel Construction Group Plans Annual Design Contest

••• The following Jury has been appointed by the American Institute of Steel Construction to select on Feb. 17 the prize-winning designs in the students' annual bridge design competition: Hugh Ferriss, architect; Arthur C. Holden, Holden, McLaughlin & Associates, Architects; F. A. Burdett, consulting engineer; Howard Myers, editor of Architectural Forum; Morris Goodkind, bridge engineer, state highway department of New Jersey.

Prizes in the competition, which has been held annually for fourteen years, will be \$200, \$100 and \$50.



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SPROCKETS



ALSO GREY IRON AND SEMI-STEEL CASTINGS



### Glass Gage Development Described By Army Engineer

••• Large-scale substitution of glass for steel in the manufacture of precision gages will be possible soon as the result of experiments by the War Department, Thornton Lewis, deputy chief of the Production Service Branch of the Army's Ordnance Department, said in a speech at the annual meeting of the American Society of Mechan-

ical Engineers in New York on Dec. 1. Mr. Lewis said the Ordnance Department's experiments indicate that up to 50 per cent of the hundreds of thousands of steel gages used by manufacturers and inspectors of ordnance items eventually can be replaced by glass products.

"Although only a few glass gages have been placed in service, in some respects they have proved more efficient than steel gages," Mr. Lewis said. "Many greasings

and degreasings are eliminated since no question of rust is involved," he pointed out. "Likewise scratches on glass do not raise a burr or change the effective size of the gage. The glass is lighter and easier to handle and in some cases visibility of inspection is afforded."

Mr. Lewis also stressed the fact that thermal conductivity of glass is less than steel and that heat transmitted from the hands of the inspector will not affect the gaging dimensions. Likewise, he said, perspiration on the hands of the inspector has no corrosive effect on a glass gage.

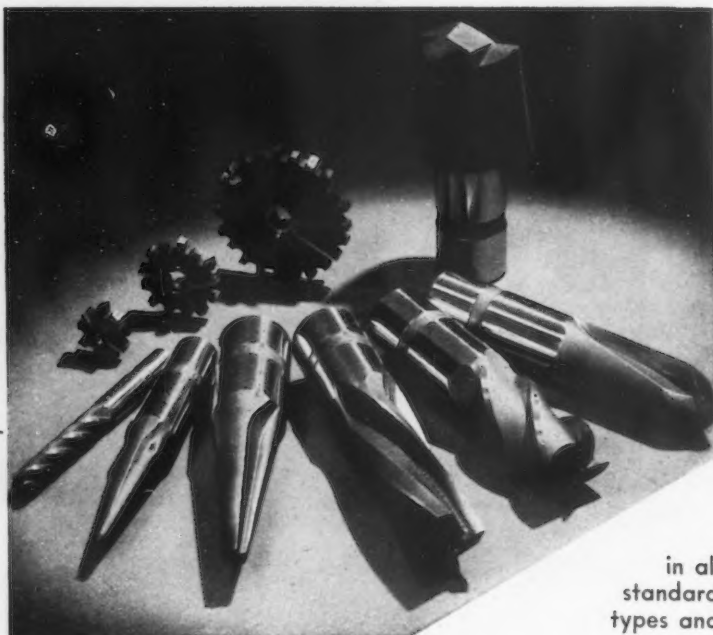
"Most important at this time," Mr. Lewis added, "is the saving of tool steels. Also especially worthwhile is the fact that after the molds for glass gages are made, the cost of glass gages is about half that of steel gages."

Mr. Lewis pointed out that the war has shown itself to be a competition of nations to see which can produce the most needed material in the shortest possible time, adding that the Army Ordnance Department has leaned heavily on civilian engineers for assistance and is continually calling for suggestions on new designs.

"The Army Ordnance Department is meeting this competition of global war by constantly going over designs and seeking improvements," he said. "The bulk of our problem naturally rests with the design engineers of industry. Their number and experience place a force of incalculable value behind our production program, a force that can be equaled by no other country in the world. The Ordnance Department is anxious to receive suggestions for design changes from all sources and is geared to place quick approval on the good ones."

Mr. Lewis urged the engineers to submit their suggestions to any of the 13 Ordnance district offices over the country or to send them to Major General T. J. Hayes, Ordnance Department, Pentagon Building, Washington.

A special corps of design engineers receives every suggestion and if any are used the person offering it is notified. He said that many suggestions from civilian engineers had been put into use by the Army, some of them



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bringing about entirely new designs in ordnance material and still others resulting in the saving of thousands of tons of critical metals. Mr. Lewis said that a check made early in November revealed that more than 1100 suggestions have been received and studied by the Ordnance Department.

"About half of these we received were general in character and the remaining half covered some specific design," Mr. Lewis said. "The latter have all been thoroughly investigated and about 60 per cent put into use."

### Cited for Award

••• The following shipyards and manufacturing plants have recently been awarded the Maritime Commission "M" or gold star for meritorious production:

Delta Shipbuilding Co., Inc., New Orleans.  
Bethlehem-Fairfield Shipyard, Inc., Baltimore (third time)  
California Shipbuilding Corp., Wilmington, Cal. (fourth time)  
North Carolina Shipbuilding Co., Wilmington, N. C. (third time)  
Oregon Shipbuilding Corp., Portland, Ore. (seventh time)  
Richmond Shipyard No. 1, Richmond, Cal. (fourth time)  
Richmond Shipyard No. 2, Richmond, Cal. (third time)  
Alcoa division of American Locomotive Co., New York  
Cooper-Bessemer Corp., Mt. Vernon, Ohio and Grove City, Pa.  
Davis Engineering Corp., Elizabeth, N. J.  
Federal Telephone & Radio Corp., Newark  
M. W. Kellogg Co., Jersey City  
National Supply Co., Springfield, Ohio  
Production Engineering Co., Berkeley, Cal.  
Tube-Turns, Inc., Louisville, Ky.  
Young Iron Works, Seattle

### ARMY-NAVY "E"

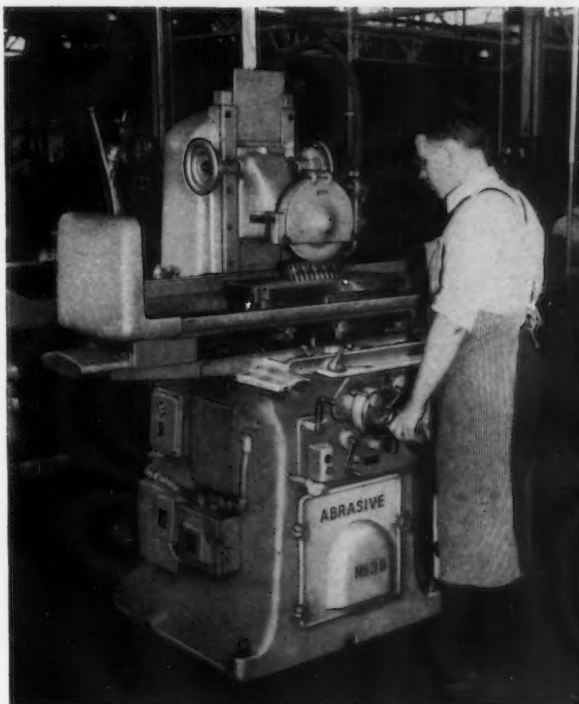
To Edwards Division of Rogers Diesel and Aircraft Corporation—On November 30, 1942, at Sanford, North Carolina, the Army-Navy "E" was awarded to the Edwards Company, a division of the Rogers Diesel and Aircraft Corporation, New York, N. Y. The Company and its employees received this award for outstanding excellence in performance and production.

### Weirton Claims New Ingot Production Record

••• For the second time this year, the Weirton Steel Co. has set a new world's record for steel ingot production from twelve stationary open hearth furnaces, according to the Weirton Steel Joint Labor - Management Committee. Established during November, the record, according to all available open hearth statistics, constitutes

an all-time high for production of steel ingots by the stationary open hearth process.

Topping by 121 net tons a day the world's record established here last March, the record tonnage achieved by Weirton Steel during the month of November reached an average of 5080 net tons of ingot steel per day. The March record stood at 4959 net tons per day.



*Accuracy  
is  
essential*

**1 IN SNAP GAGES**

**2 IN ABRASIVE  
SURFACE GRINDERS**

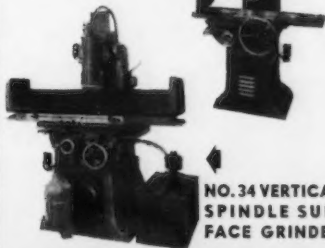
But accuracy—either in a gage or a surface grinder—isn't something that "just happens!"

Whatever the product, it is safe to say that "accuracy" depends upon design, materials, workmanship, and supervision.

The founder of this Company started in 1916 with a sound idea for building an accurate Surface Grinder. Improvements made since that date in "Abrasive" Surface Grinders have been the result of constantly expanding experience which has led to better design; use of better materials as they have become available; improved workmanship; and the most careful supervision of every operation. We are confident you will be as pleased, as thousands of other users, with "Abrasive" accuracy.

Catalogs illustrating any of these three machines illustrated will be gladly furnished, address—

**NO. 1½ HAND-OPERATED SURFACE GRINDER**



**NO. 34 VERTICAL SPINDLE SURFACE GRINDER**

**ABRASIVE MACHINE TOOL COMPANY**

*Dealers in Principal Cities*

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## Foundrymen Study High Temperature Applications

Chicago

••• At the instigation of the A.F.A. committee on high temperature properties of cast iron of the American Foundrymen's Association, and with the approval of WPB, the war metallurgy committee of the American Foundrymen's Association is sponsoring

"A Study of the Possibilities of the Increased Utilization of Cast Iron in High Temperature Applications." It will be under the immediate supervision of Dr. A. E. Schuh, research supervisor on cast metal for the war metallurgy committee.

T. E. Barlow, Vanadium Corp. of America, Detroit, and C. O. Burgess, Union Carbide and Carbon Research Laboratories, Niagara Falls, N. Y., have been

assigned to the work as technical investigators. A subcommittee of the High Temperature Properties of Cast Iron Committee consisting of R. J. Allen, chairman, Worthington Pump and Machinery Corp., R. G. McElwee, Vanadium Corp. of America, Detroit, J. S. Vanick, International Nickel Co., and Max Kuniansky, Lynchburg Foundry and Machine Co., Lynchburg, Va., is acting in an advisory capacity.

For the present the study will be confined to gray and low alloy irons operating at temperatures between 450 deg. F., the present A.S.M.E. code limit, and 1000 deg. F., rather than to the normally construed "high temperature" field of 1200 deg. F. and above, in which more highly alloyed materials are involved. Users and producers of cast iron parts operating at temperatures within the limits indicated are invited to contribute pertinent data which might be helpful to the committee, by addressing their communications to T. E. Barlow, Vanadium Corp. of America, 2440 Book Building, Detroit.

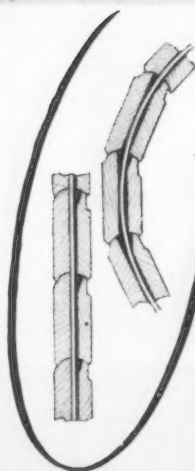
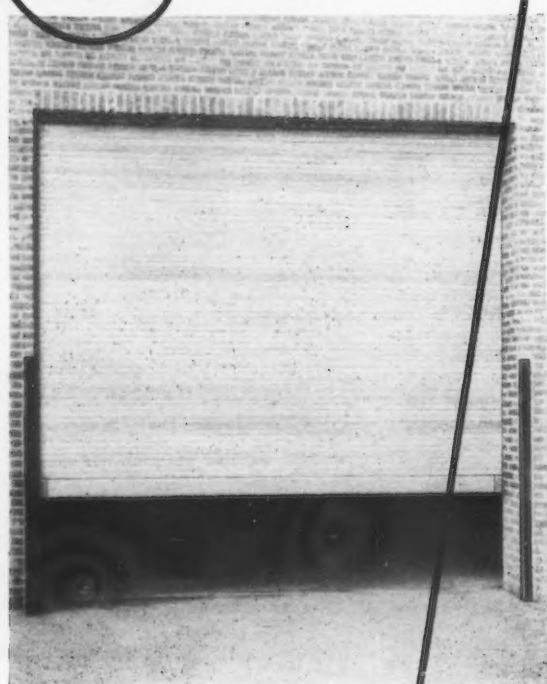
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Constructed of inter-lapped wood slats jointed with metal cables or tapes, they coil above the opening, remain out of the way and out of reach of damage, and require no usable floor, wall or ceiling space for either storage or operation. The rugged curtain assembly offers a high degree of protection, and blocks out wind and weather. The illustrations at right show the design of the wood slats, how the slats are assembled, and how they permit the curtain to flex without binding the metal tapes. Kinnear Wood Rolling Doors are available in any size, with motor, manual or mechanical operation. Write for complete details!

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IN DOORWAYS

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## War Department O.K.'s Five Large New Projects

••• The War Department announced Dec. 1:

1. Authorization for the construction of a military installation in Coryell County, Texas, to cost in excess of five million dollars. Construction will be supervised by the San Antonio district office of the Corps of Engineers.

2. Authorization for the construction of an air forces installation at Memphis, to cost in excess of five million dollars. Construction will be supervised by the Mobile district office of the Corps of Engineers.

3. Authorization for the construction of an air forces installation at Tyler, Texas, to cost approximately five million dollars. Construction will be supervised by the Denison, Texas, district office of the Corps of Engineers.

4. Authorization for construction of an air forces installation at Mountain Home, Idaho, to cost in excess of five million dollars. Construction will be supervised by the Portland district office of the Corps of Engineers.



### Sources of Alloys Below German Needs

• • • Although steel plants in Axis Europe can probably obtain adequate tonnages of iron ore and coal for their operations, supplies of alloy materials may be difficult to maintain in the face of intensified bombing.

A recent study by the American Iron & Steel Institute indicates that Germany has available in continental Europe only about one-third of the manganese, less than half of the chromium and a mere 10 per cent of the nickel needed to keep pace with the United States in producing alloy steels.

For the rest, previously accumulated stockpiles must be tapped. Neither Germany itself, nor any other European country which has fallen to German armies or come within the orbit of German commercial or political domination is on record as a major source of those alloys.

Turkey, a neutral nation, possesses in Asia chrome ores of high quality, and outranks all other producers of chromite save South Africa. Even if all Turkish chromite were available to Germany, however, the supply would be less than the estimated demand.

### Olds Sees New Units Ready In First Half of 1943

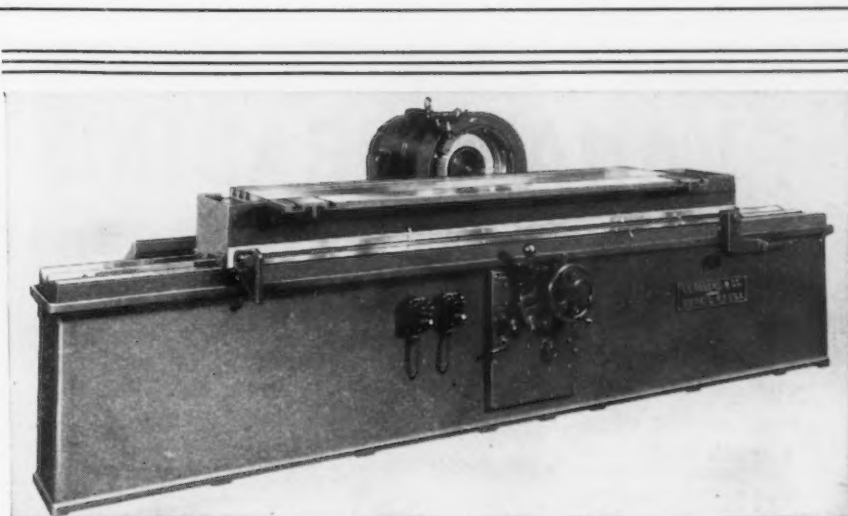
• • • "United States Steel Corp. is engaged in the greatest plant expansion project in its history, costing more than \$700,000,000—about two-thirds of which is for account of the Government," Irving S. Olds, chairman of the board of directors, said Dec. 7 in a statement reviewing accomplishments of the corporation and subsidiary companies during the first year of the war.

New steel producing or finishing units near Pittsburgh, Chicago, Cleveland, Birmingham, Duluth, Worcester, Mass., Provo, Utah, and on the West Coast are being pushed to completion night and day by thousands of workers. Most of these units will go into production during the first half of 1943. A major part of the new facilities is being erected by U. S. Steel for the account and at the expense of the Government. For the remainder, the corporation is using its own funds.

Reviewing the corporation's production figures, Mr. Olds stated that more than 1000 new produc-

tion records have been established since Pearl Harbor by U. S. Steel subsidiaries. As instances of outstanding performances, the U. S. Steel chairman cited the delivery of 24 destroyers, 2 cruisers, and many merchant ships, tankers, and auxiliary vessels; the invention and production of portable steel runways for airplanes; an accelerated method of spinning bomb casings; completion in four

months of 550 miles of pipe for the war emergency oil pipe line; and the production in one week by a single subsidiary of a quantity of steel plates in excess of the amount required for the building of 7000 General Grant tanks. Mr. Olds pointed out that U. S. Steel plants had a larger steel output than all of the units of Germany and Japan combined, on the basis of the latest information available.



## New! TYPE NT-20 ROGERS FACE GRINDER



CAPACITY 60-72"x16"x12"

Engineered and built by a company with 56 years' experience in the originating and construction of straight and circular knife grinders . . . this business-like new *traveling table face grinder* can "take it" on severest continuous production schedules.

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**ROGERS KNIFE GRINDERS**  
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## Canada Acts Again to Conserve Critical Materials

Ottawa

• • • Canada has issued a new order freezing the types of circulating, condensation and vacuum pumps which may be made in this country. The order also limits the types of control apparatus which may be used to regulate these pumps. This action was taken to conserve critical materials and

avoid importation of parts now difficult to obtain from the United States. The new order (A-484) issued by E. J. Laidlaw, administrator of heating, plumbing and air conditioning equipment and supplies, Wartime Prices and Trades Board, also prohibits manufacture of the vertical type of circulating, condensation and vacuum pumps, except with written permission of the administrator, and also the use of ball bear-

ings in the manufacture of these pumps.

A concurrent order prohibits the manufacture of humidifiers for all industrial use, except by special permit. Metal household humidifiers were prohibited in an earlier order SC-26.

A third order A-485 prescribes the types and sizes of surface heating coils which may be manufactured in Canada. Order A-485 follows:

1. No person shall manufacture any surface heating coil except of a type and size as follows: (a) Standard (single tube) type—headers in the size known as "12 and 18 tube face" or "18 and 24-in." (b) Steam distributing tube (tube within a tube) type—headers in the size known as "6 and 12 tube face" or "18 and 30-in."

2. No person shall manufacture any header of other than case metal, for use in any heating coil.

3. No person shall, except with the written permission of the Administrator, sell or offer to sell any new surface heating coil, provided that nothing in this section shall apply to a sale of such heating coils to the Department of Munitions and Supply, the Department of National Defense, or any agency of such departments.

4. Nothing in the order contained shall be deemed to prohibit or restrict the manufacture of any surface heating coil from material or parts on hand at the date of this order in such form that the same cannot be completed in accordance with the terms of the order.

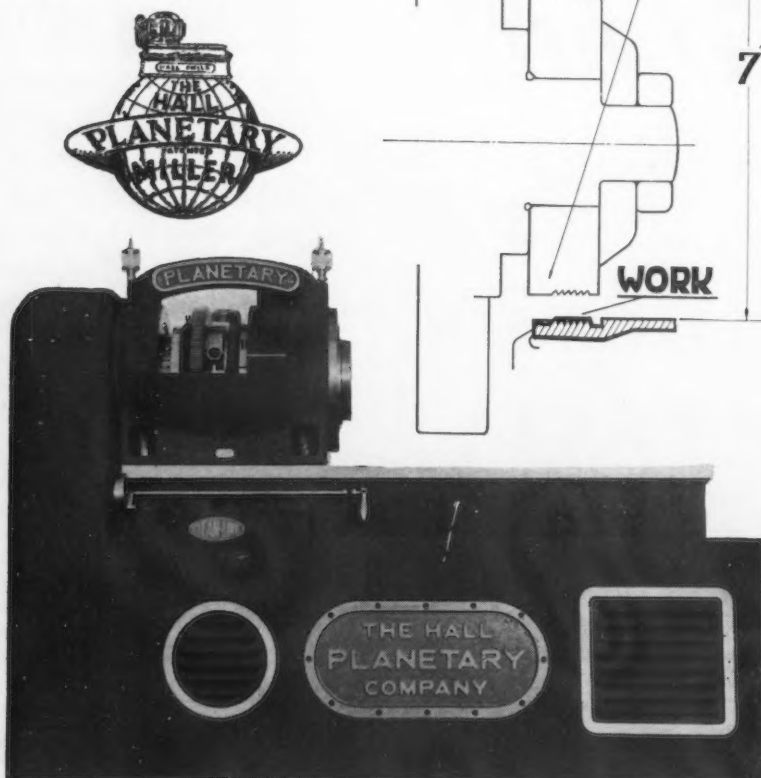
All three Orders became effective on and after Nov. 23, 1942.

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## Construction Up 10 Per Cent Federal Volume Gains

New York

• • • Engineering construction volume for the week, \$103,143,000, tops the total for the corresponding 1941 week by 10 per cent, and is well in excess of the \$65,929,000 reported for the holiday-shortened preceding week by *Engineering News-Record*.

Federal construction accounts for 93 per cent of the week's volume and is 35 per cent higher than in the same week last year. As a result of the federal gain, public construction is 18 per cent above a year ago, despite a 71 per cent drop in state and municipal work. Private volume is 60 per cent below the 1941 week's total.

The current week's volume brings 1942 construction to \$9,035,350,000, an increase of 59 per cent over the total for the 49-week period last year. Private construction for the period, \$546,182,000, is 52 per cent below a year ago, but public work, \$8,489,168,000, is 86 per cent higher due to the 134 per cent gain in federal.



## Willow Run Starts Delivery of Bombers

Detroit

• • • The Willow Run bomber plant of the Ford Motor Co. has started delivery of Consolidated B-24 bombers to the government. This was revealed last week officially when a touring group of newsmen were taken through the giant plant.

It was stated that "not more than a few each fortnight" are now being produced, and that it will be many months before bomber-an-hour or anything approximating such output can be achieved. However, three-figure totals of production are expected to be reached each month by early next spring. Peak speeds will be reached before the end of 1943.

## Wrought Copper and Brass Under Allocation in Canada

Toronto

• • • Wrought copper and brass have been placed formally under direct allocation in Canada, Department of Munitions and Supply, announced. A new order by G. C. Bateman, Metals Controller, consolidates previous directives. It further provides that a sale of 300 pounds or more must have the controller's prior approval, and that a sale of less than 300 pounds may be made without permit, but only if it is for a purpose necessary to war production, public health, communications, transportation, or some other essential use defined in the order.

Of the wrought copper and brass produced in Canada more than 98 per cent is being used for the manufacture in this country of shells, warplanes, ships, guns and other war supplies. Less than one per cent goes into essential civilian uses, and the small balance is divided between exports and non-essential uses. Of the copper wire being made in Canada, 53 per cent is used for direct war purposes in this country, 45.5 per cent for essential civilian purposes, eight-tenths of one per cent for exports, and seven-tenths of one per cent for non-essential civilian manufacture. The Department also stated that less than one-third of one per cent of the copper mined in Canada is now

being used for purposes which are not directly or indirectly associated with the war program.

## Canadian Resigns from Joint Production Committee

Ottawa


• • • G. K. Sheils, deputy minister of the Department of Munitions and Supply, has resigned from the Canadian section of the Joint War Production Committee of the

United States and Canada. H. J. Carmichael, co-ordinator of production of the Department of Munitions and Supply, has been appointed chairman of the Canadian Section, and to fill the vacancy created by the resignation of Mr. Sheils, E. J. Brunning, director general of the Ammunition and Gun Production Branch of the Department, has been appointed a member of the Canadian Section of the Committee.

LOOK WHAT

# Balance

DOES

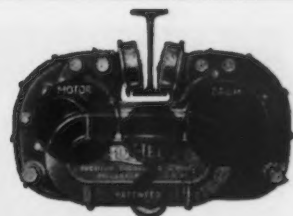


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The Lo-Hed Hoist Is Applicable To Any Monorail System. There's A Balanced Lo-Hed Electric Hoist For Every Purpose

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## Look what BALANCE does in an electric hoist

Looking for an electric hoist that will give you years of satisfactory service after the war? Then take a look at the balanced construction of the Lo-Hed hoist—motor and drum arranged on opposite sides of the beam.

This unique construction gives you minimum headroom—a desirable plus feature for which you pay no premium. Balanced construction means much to you in dollars and reliability.

Because of balanced construction, the Lo-Hed hoist can use an efficient all-spur gear drive (sealed in oil), husky, short shafts for greater torsional strength, easily removable covers.

Along with these Lo-Hed features is everything else you want in an electric hoist—heavy duty hoist motor, ball or roller bearings, automatic holding brake, 100% positive automatic upper limit stop, fire, dust and moisture proof controller, and precision machining. Buy the hoist that will last longer—Lo-Hed. Ask for the complete catalog of Lo-Hed Hoists.



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## Ore Season On Lakes Nears End

Cleveland

••• With the ore season just about closed because of the cold weather that has set in both in upper and lower lake regions, very few more boats will make the down lake trip loaded with ore this year. However, the astounding total of 91,440,952 long tons of ore has been moved out of the upper

lake ports this year into lower lake ports of the United States and to Canadian ports. From United States upper lake ports alone, 90,968,081 gross tons of ore have been delivered.

November shipments from upper lake ports were down considerably from October, totaling 7,582,425 tons as against the 11,417,167 tons shipped during the previous month. Of the November shipments, 7,537,969 tons were shipped

from American ports and 44,456 tons from Canadian ports.

Since Dec. 1 there have been only about six cargoes loaded in at northern ports, and on Dec. 4, some 35 to 40 ships were still in the ports waiting to be loaded. It is expected that some of these boats still waiting to be loaded will be released and sent to the southern lake areas for hauling grain.

Cumulative downlake shipments this year are 12,159,673 gross tons greater than last year's total of 79,281,279 tons to Dec. 1. Shipments this year from the various upper lake ports were as follows:

	Gross Tons	
	1942	1941
Escanaba .....	6,192,669	4,513,079
Marquette .....	4,806,439	5,606,527
Ashland .....	6,158,427	6,219,156
Superior .....	31,421,276	27,566,213
Duluth .....	23,740,082	20,115,431
Two Harbors .....	18,649,188	14,811,381
Total U. S. ports .....	90,968,081	78,831,787
Michipicoten .....	472,871	449,492
Grand total .....	91,440,952	79,281,279



Fusing Bauxite to produce Lionite

**ABRASIVE** grains are essential materials. They must be conserved as a vital war necessity. But with the demand for higher and higher production, conservation is sometimes sacrificed for speed.

Many manufacturers find, however, that by using NB lionite for their polishing wheels they get from 25% to 100% more production per wheel. They not only conserve vital material but increase production as well.

NB Lionite is an ideal abrasive to use with cements. Its polyhedral shaped grains with their tough, sharp, cutting points are free from non-productive flats and slivers. They cut fast and wear down slowly.

Aircraft engines, propellers, ordnance material, range finders and innumerable other war supplies are getting to the battle fronts faster because of NB Lionite. Our entire capacity is devoted to producing abrasives for war industries and we welcome the opportunity of increasing the production of those companies not now using NB Lionite. Send us your inquiry.

**GENERAL ABRASIVE CO., INC.**  
**NIAGARA FALLS, NEW YORK U. S. A.**



## Production by Lukens Sets All-Time Record

Coatesville, Pa.

••• Lukens Steel Co. last week revealed that its production, in the company's fiscal year ended Oct. 10, set a new all-time record, scoring an increase of 40.8 per cent over its output in the 1941 fiscal year, which also was an all-time peak.

The output report does not cover operations of the company's two subsidiaries, By-Products Steel Corp. and Lukenweld, Inc., both of which also established new all-time records in the fabrication of war materials during the 1942 fiscal year.

## Detection of Boron To Be Discussed at Pittsburgh

Pittsburgh

••• The Molybdenum Corp. of America, in conjunction with the University of Pittsburgh, is holding a symposium on the detection of small amounts of boron by chemical and spectrographic methods at the University of Pittsburgh on Dec. 21.

The meeting will be under the direction of Dr. Wurga, University of Pittsburgh, and Mr. J. Alfred Berger, research metallurgist, Molybdenum Corp., Pittsburgh.

## Huge Planes Seen Near Production

New York

• • • Aircraft capable of carrying 400 passengers at 500 mph. and making non-stop round trips to Europe as bombers were called ready for production by T. M. Girdler. He spoke last week before the New York State Chamber of Commerce.

Mr. Girdler, chairman of the board for Consolidated Aircraft Corp., Vultee Aircraft, Inc., and Republic Steel Corp., said that the same minds which had planned the B-24 Liberator and PBX Flying Boats had planned this huge craft to the point where production was now only a matter of men and materials.

Reporting on the current progress of the aircraft industry, Mr. Girdler said that 30 prime contractors were now building 70 different types of aircraft and that the industry was operating on appropriations of about \$50-billion over the period since June, 1940. Present day productive capacity was called only 60 per cent of the volume possible with sufficient men and materials. Production could be approximately doubled, he said.

The Chamber voted a resolution for the adoption of the 48-hour week without penalty pay and in the same resolution called for the government to centralize control of manpower in one agency. (This has since been done with the reauthorization of McNutt as sole head of Manpower and Selective Service by Presidential order). The chamber also adopted a resolution urging that the government coordinate into one agency the gathering of reports and information.

## Reliance Honors Workers For Attendance Record

Cleveland

• • • Over 150 men and women workers at the Reliance Electric & Engineering Co., have not missed a single working day from their jobs for the 12 months since Pearl Harbor, according to a report made to company executives by the Labor - Management Committee. These men and women were honored Monday at special dinners tendered them by the management.

## Pipe Promptly Produced For Line, Batcheller Says

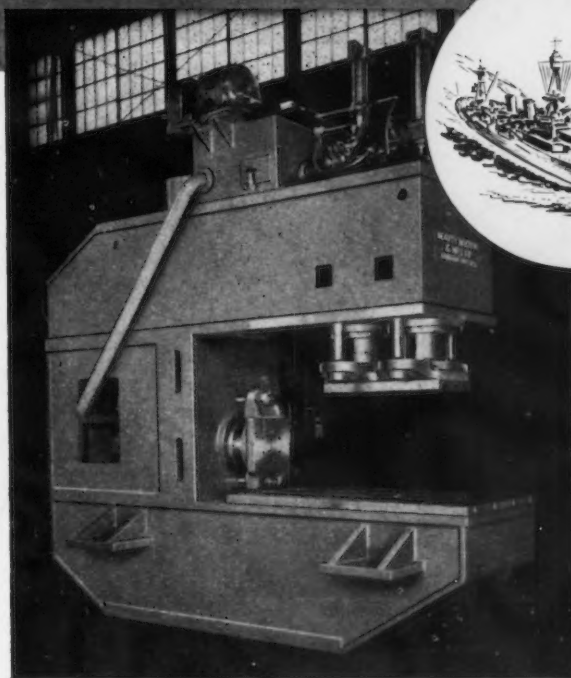
• • • There has been no delay in the construction of the war emergency pipe line because of deliveries of pipe and none is anticipated, Hiland G. Batcheller, director of the WPB Steel Division said Dec. 4.

"All of the pipe for the first section of the war emergency pipe

line from East Texas oil fields to Norris City, Ill., has been produced and delivered," Mr. Batcheller declared.

"Approximately 70,000 net tons of pipe for the second section from Norris City to the Eastern Seaboard will be produced and delivered by the end of the year and the remaining 150,000 tons of pipe are scheduled for production during the first quarter of 1943."

## WHAT PUTS THE BATTLE IN A BATTLESHIP?



### BEATTY 400-TON FLANGING AND FORMING PRESS



250-Ton Capacity Hydraulic Press

IT'S ARMOR PLATE that keeps a battleship afloat. The thicker the plate, the stronger the ship . . . and the more powerful the PRESS required to fabricate that armored hull! Beatty-Engineered Hydraulic Presses (up to 750-ton capacities) are being used extensively in the shipbuilding, tank, railroad car, and other vital war industries. But this is just one of Beatty's heavy metal working machines. If your production calls for punching, shearing, coping, pressing, forming, flanging or the like, call in a Beatty engineer to help you select the right machine for the job. Write for complete information.

# BEATTY

MACHINE & MFG. COMPANY  
HAMMOND, INDIANA



## War Output Hurt By Endless Forms

Washington

...With Government questionnaires pouring upon it like an avalanche, business is telling the Joint Committee on Reduction of Non-Essential Expenditures of the burden it faces in making endless forms. Not only is the job of answering questions costing many millions in dollars, but it is taking

such a vast amount of time that, in the words of President Eric A. Johnston of the Chamber of Commerce, the situation has become "so serious as actually to interfere with activities essential to the efficient conduct of the war."

The Chamber and the National Association of Manufacturers collectively speaking for business and industry throughout the country, joined individual business interests in telling the Committee of

the fantastic proportions Government questionnaires have reached. These two business organizations presented their views, before the Committee last Thursday. Mr. Johnston spoke for the Chamber and George Roscoe, assistant director, spoke for the NAM. The NAM statement submitted by Mr. Roscoe was based on an association sampling survey of Government questionnaires and reports. Ten industries and 89 companies were included in the survey. Of this number 37 per cent were engaged in the iron and steel industry; 26 per cent in the machinery industry and 37 per cent in other industry groups.

The association submitted five suggestions from various companies as a means of reducing the number of questionnaires and reports, a purpose that the Committee has in mind. The chamber approved as "a step in right direction" the action of the Bureau of the Budget which has requested a number of business organizations to set up an Advisory Committee on Government Questionnaires to provide the bureau and other Government agencies with information and contacts with industry which will assist them in dealing constructively with the problem. By an executive order all government questionnaires and report forms must be cleared through the bureau and approved by it. After Jan. 1 a reply need not be made to a government questionnaire which does not bear the bureau's approval number. But Congress clearly is in a mood to take the matter into its own hands and not to leave it entirely with the Executive Branch.

The temper of Congress was seen when the Senate, immediately after the Committee hearing last Thursday, unanimously adopted a resolution by Senator Vandenberg, Republican of Michigan, authorizing a formal investigation by the Committee of the questionnaire blitz. Senator Vandenberg is a member of the Committee, which is headed by Senator Byrd, Democrat of Virginia.

Suggestions made by various companies, as summarized by NAM were:

1. Identify the subject matter (confusion is spread by a lack of clarity).
2. Make the form fit the facts,



**FLATNESS  
AND  
SMOOTHNESS  
of Production Parts**

YOUR production parts finished by the new Ultra-Lap machine method, to an optically flat surface . . . to specifications for flatness of one light band or less . . . to a smoothness as low as one micro-inch R.M.S. . . . any metal or material, or any combination thereof . . . much faster, more uniform than hand methods.

Machine designed for you or we shall be pleased to lap your parts on a job basis. Ultra-Lap machines and service used by aircraft and many other war-time industries.

**Ultra-Lap MACHINE COMPANY**  
255 McDOUGALL AVE. DETROIT, MICH.



## Cutler-Hammer, Inc., Marks Its 50th Year

Milwaukee

• • • Cutler-Hammer, Inc., is celebrating its 50th anniversary this year. The event was given official recognition by President Frank R. Bacon on Dec. 5 when he held an informal dinner and party for some 275 employees who have served the company for periods ranging from 25 to 47 years.

The firm was organized in 1892 by H. H. Cutler and E. W. Hammer as the Chicago Electric & Mfg. Co. in that city. A year later the name was changed when the company was incorporated in Illinois as the Cutler-Hammer Mfg. Co. Three years later in Milwaukee there was organized the American Rheostat Co. with Frank R. Bacon as the head. In 1898 this company acquired the Cutler-Hammer firm and changed the name to Cutler-Hammer, Inc., moving the merged firms to Chicago. Only a year later the new firm was moved back to Milwaukee where greater facilities for expansion were available and on the site where the extensive productive factory still is located.

(too often too little space is allowed for the answer).

3. Eliminate superfluous requests for information.

4. Avoid "peaking" the reports required, thus minimizing rush, overtime, and use of executives' time on reports.

5. End duplication by establishing a central authority for materials requisitions.

Mr. Roscoe told the Committee that it must be remembered that allocations and priorities require a whole new set of routines of their own. One company, he pointed out, may be penalized as against another by failure to score in the "paper race." Allocations of vital war materials to a certain plant must frequently wait until all other plants in the same manufacturing category have filed their requisitions.

"Finally," said Mr. Roscoe, "we should consider which is more important, reports or production."

Referring to the NAM survey, Mr. Roscoe said that of the 89 companies covered 84 were obliged to complete 3479 government reports during the second quarter of 1942, an average of 164 question-

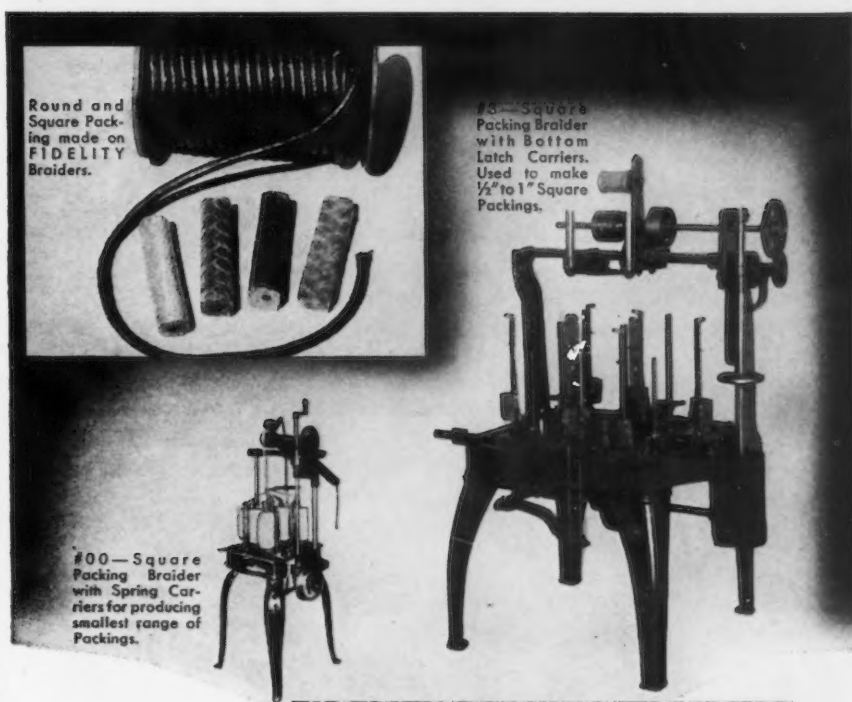
naires a year for each company. The examination, Mr. Roscoe said, revealed that industries bearing the greatest war production burden also bear the greatest burden of reports.

Mr. Roscoe submitted the following to show the number of questionnaires received by the Federal Government per year as to industry:

Textiles 40; miscellaneous manufacturing industry 108; non-ferrous metals 112; food 112; iron

and steel 156; leather 176; chemicals 184; machinery 184; electrical machinery 220; transportation equipment 220.

"To complete these forms it takes these 89 companies a total of 495,480 man-hours a year," Mr. Roscoe explained. "The recurring reports require 430,636 man-hours. The non-recurring reports take 84,844 man-hours. That is 13 per cent for the non-recurring reports; 87 per cent for the recurring.



### FIDELITY PACKING BRAIDERS

Speed — 15 to 40% higher  
Yarn Capacity — 80 to 100% greater

FIDELITY Packing Braiders—single or multiple head . . . speed the production of round, square or special packings from asbestos, flax and jute yarns.

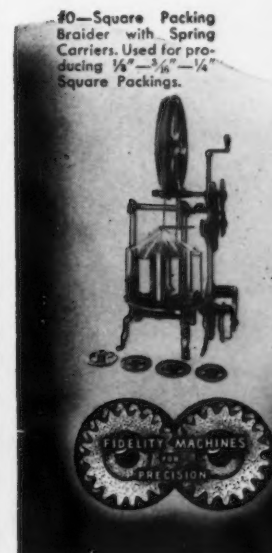
Bottom Latch and Spring Bottom Latch Carriers, used on FIDELITY Packing Braiders, operate at speeds 15 to 40% higher than the old type top weight carriers and have a yarn capacity 80 to 100% greater. Output varies according to size of packing and type of carrier . . . from 180 to 360 stitches per minute on Round Braiders . . . and from 60 to 500 stitches per minute on Square Braiders.

Low power consumption, stop motion protection, change gears for different size packings and use of larger yarn packages are other outstanding advantages of FIDELITY Packing Braiders.

FIDELITY manufactures a variety of machines for the Textile Industry, the Wire Field and for Rubber Organizations. Special machines are built for many lines of industry.

Write for detailed information

**FIDELITY MACHINE COMPANY**  
3908-18 Frankford Ave., Philadelphia, Pa.



## 175 Plants Said to Lack War Work in Alabama

Birmingham

• • • Alabama has 175 plants capable of doing war work but which are not now so engaged, W. A. Steadman, president of the Alabama State Chamber of Commerce, told the Congressional Committee on Small Business at a hearing here Dec. 4. He estimated

707 or 80 per cent of the state's firms are engaged directly or indirectly in war work.

Steadman said one of the principal reasons the 175 firms are not engaged in war work lies in the fact that they do not have the engineering or accounting staff which so often is necessary to execute a prime contract with the government.

## More Steel Demanded By Army Specifications

• • • The tanks and field guns that go roaring into battle for the United Nations will carry more iron and steel than ever this coming year, according to the American Iron and Steel Institute.

Army engineers are specifying ever-increasing numbers of steel functional parts. This program, when fully in effect, will free 180,000,000 lb. of primary aluminum and untold amounts of copper and copper alloys.

Key points at which steel is pinch-hitting for aluminum are: 140 individual parts on medium and light tanks; fins to guide mortar shells; "windshields" for long range, high velocity shells; mortar components; carriages for guns from 20 mm. to 155 mm.; components of anti-tank mines, fire control instruments, telescopes and range finders.

Although Army authorities are relying more than ever upon steel, they do not specify steel for any new use until it has passed a rigid test and satisfied every requirement. No sacrifice of performance is permitted.

## J. & L. Purchases Wackman Welded Ware Co.

Pittsburgh

• • • Jones & Laughlin Steel Corp. has purchased the Wackman Welded Ware Co., barrel makers, of St. Louis. This is the second barrel company which Jones & Laughlin has absorbed, the former one having been the Bayonne Steel Barrel Co. This latter company had its name changed to the J. & L. Steel Barrel Co. with headquarters at New York.

The Wackman outfit, with plants at St. Louis, New Orleans, Tulsa, Lake Charles, Tex., North Kansas City, and Chester, Pa., will be absorbed into the J. & L. Steel Barrel Co.

## Scrap Institute Moves Washington Headquarters

• • • National headquarters of the Institute of Scrap Iron & Steel, Inc., of which E. C. Barringer is president and executive secretary, are now at 1120 Connecticut Avenue, N.W., Washington. It is expected that the telephone number will remain unchanged as District 2463.

## FARREL-SYKES GEARS

### for Rugged, Smooth Running ROLLING MILL DRIVES

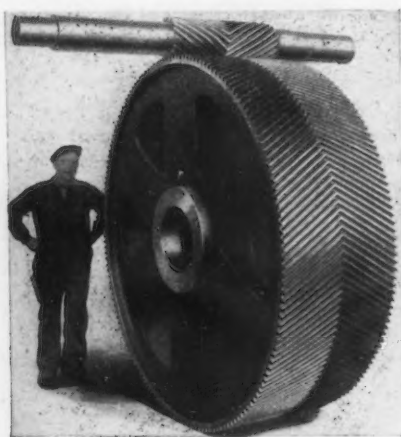
Farrel-Sykes Gears for rolling mill drives meet today's war production demands for ruggedness, for ability to withstand the shocks, stresses and wear incident to high speeds and heavy loads, and for efficient, trouble-free performance.

With the greater bearing surface provided by their continuous herringbone teeth, Farrel-Sykes Gears are stronger and better able to carry heavier loads at high speed. In consequence, they offer the advantages of reduced weight and size for a given load requirement, together with exceptionally quiet, smooth-running operation.

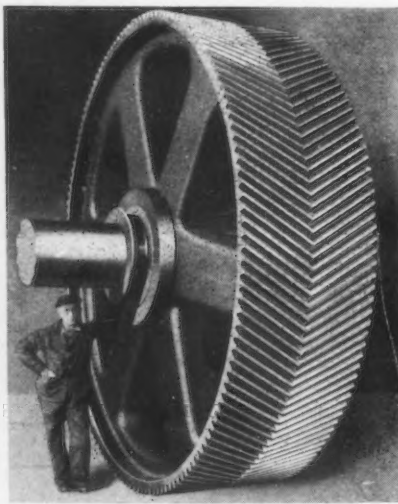
Due to the interlacing and creeping engagement of their teeth and inclined

line of pressure, Farrel-Sykes Gears are better able to withstand wear. And their involute profile and correct tooth action are maintained as long as the gears last. Furthermore, their opposed helices balance and absorb axial thrust within the gear member, eliminating harmful thrust loads and resultant stresses on other parts of the machinery.

These are but some of the many features that account for the long-lived, economical performance of Farrel-Sykes Gears for rolling mill drives. Farrel engineers are always available for consultation on gear problems.



High ratio gears for a rolling mill drive. In the limited space available only continuous tooth herringbone gears were able to meet the requirements.



Continuous tooth herringbone gear for rolling mill drive, 5,000 HP, weight 61,700 lbs., 145" diameter, 145 teeth, 1 DP, 40" face.

**FARREL-SYKES**

**FARREL-BIRMINGHAM COMPANY, Inc.**

ANSONIA, CONN. - - - - - BUFFALO, N. Y.

*The Gear with a Backbone*



## Equipment Taken from Two Cleveland Companies

Cleveland

• • • Two companies in this area this week were served with requisition papers for moving vital, idle equipment which the owners refused to sell at ceiling prices, it was announced by the WPB Materials Redistribution Branch. These are the first cases of their kind in the area. On Monday the equipment was moved out of the plants.

The equipment included a 25-ton crane, a five-ton auxiliary hoist, and five ladles and bales owned by Cleveland Steel Castings, Inc., and a 30-ton crane and a five-ton auxiliary hoist owned by the Steel Mill Liquidating Co. from the plant of the former W. H. Davey Steel Co., which it owns.

The Metals Reserve Co. will pay for the equipment and it will be used by the Valley Mould & Iron Corp. in a new plant.

## U. S. Steel Board In Pittsburgh Dec. 10

Pittsburgh

• • • Members of the Board of Directors, United States Steel Corporation, will be in Pittsburgh on Thursday, December 10, to attend the first meeting of the board ever to be held in this great steel-producing center, Irving S. Olds, chairman, announced today.

## Trade Notes . . .

The Brown Fintube Co., Elyria, Ohio, has announced that it will build and sell complete ready-to-use heat exchangers for the duration, as a service to buyers who are unable, due to the rush of war work, to get needed equipment from their usual sources of supply. Brown Fintube heat exchangers will be built in all standard types and in any capacity desired to meet practically any heating and cooling requirement. The welded construction used is said to provide an integral bond of metal between the fin and the central member and to result in high thermal efficiency and trouble-free operation.

Bell Machine Co., Oshkosh, Wis., opened a new office and factory building recently with its 300 employees participating in a dedicatory program.

Sterling Wheelbarrow Co., West Allis, Wis., has converted production facilities to foundry flasks.

Metallizing Co. of America, 1330 West Congress Street, Chicago, has established a new engineering service program available to everyone engaged in war work.

## WMI Signs Two New High Cost Scrap Projects

Philadelphia

• • • Word has been received here of the signing of contracts by War Materials, Inc., with local contractors for recovery of scrap from two projects in this city.

Removal of about 4000 tons of rails has been contracted for with Counties Construction & Contracting Co. of Philadelphia. This project, involving the removal of idle

street car rails in Philadelphia streets, was developed by the Special Salvage Projects Branch of WPB. The job is scheduled for completion by March 31. Repaving, which will follow the removal operation, is being done by WPA.

L. Goldstein & Sons, Philadelphia demolition firm, has been engaged to raze the abandoned power house of the Philadelphia Transportation Co. at nearby Cromby. Approximately 250 tons of scrap, mostly structural shapes, will be salvaged.

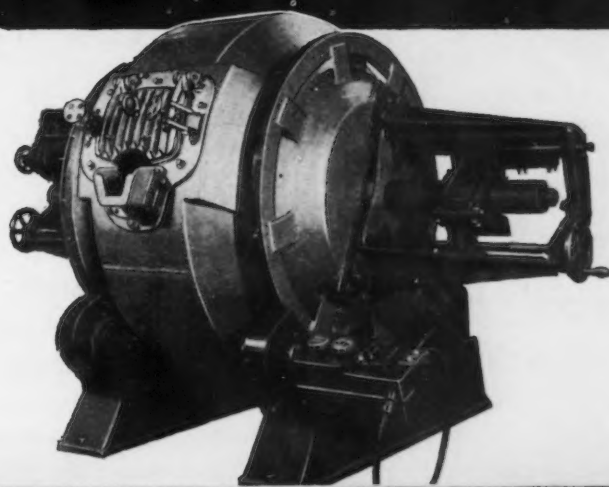
## METAL LOSS BETWEEN 0.4% AND 0.5% IN BRASS FOUNDRY

In these critical days, the conservation of metal is one of the most important advantages of a Detroit Rocking Electric Furnace.

Writes one user (the operator of a brass foundry producing valves and steam specialty pressure castings), "We have for a number of years kept accurate figures on our metal losses with our Detroit Furnaces . . . and found consistently that the loss during melting is between 0.4% and 0.5%."

Yet this is no isolated case. Users all over the country report similarly low metal losses with their Detroit Furnaces.

For low metal losses, low labor cost, savings in floor space, increased production and superior quality, the Detroit Furnace simply cannot be beaten. Write today for further facts.



**DETROIT** ELECTRIC FURNACE DIVISION  
KUHLMAN ELECTRIC COMPANY • BAY CITY MICHIGAN



## Freight Tax Arbitrary Points Will Be Absorbed

Pittsburgh

•••The 3 per cent freight increase which became effective Dec. 1 is to be handled in the steel industry practically the same as any other increase in transportation costs. The following procedure has been adopted by practically all steel companies.

1. On sales made into the so-called arbitrary basing point areas such as Detroit, Eastern Michigan, Gulf and Pacific Ports, the 3 per cent increase in freight rates will be absorbed by the steel producers. This leaves the f.o.b. delivered price of steel items at these arbitrary basing points unchanged.

2. On dislocated sales, that is sales made on an emergency basing point basis as designated in instructions to steel companies by OPA, the 3 per cent freight increase has been added to the ac-

tual transportation charges which the customer pays, and is treated as an increase.

3. On sales made by the customary basing point method the customer will pay the 3 per cent freight increase from the established basing point rate to destination. Steel companies, on the other hand, will absorb the 3 per cent increase in freight rates only to the extent that they have in the past absorbed freight costs for competitive purposes.

4. Where steel mills make shipments by government bills of lading, the 3 per cent freight increase does not apply.

### Lake Rates for Ore Rise

Washington

•••In order to encourage the greatest possible movement of iron ore down the Great Lakes this year, OPA last week authorized an

average increase of 25c. per gross ton in the established lake freight rate for ore shipped during December. The normal lake transportation season closed Nov. 30. Simultaneously, OPA allowed owners of the iron ore to pass on the exact amount of the higher freight. OPA's action was taken in cooperation with WPB and ODT.

The increase, OPA said, will compensate for higher costs, reflecting slower movement of vessels because of winter weather and greater time required in loading and unloading frozen ore. The action was taken in an effort to reach, and if possible exceed, the 1942 goal of lake shipments of 91,500,000 gross tons of iron ore. The higher average rate of \$1.05 per gross ton, an increase of 31.25 per cent above the established rate of 80c. per gross ton for lake transportation, applies only to movement of ore from upper lake ports to lower lake ports.

Ordinarily, it was pointed out, an ore boat requires eight days for a round trip between an upper lake port and a lower lake port. However, during December this turn-around time was said to be increased to approximately 11 days, with a corresponding increase in operating costs.

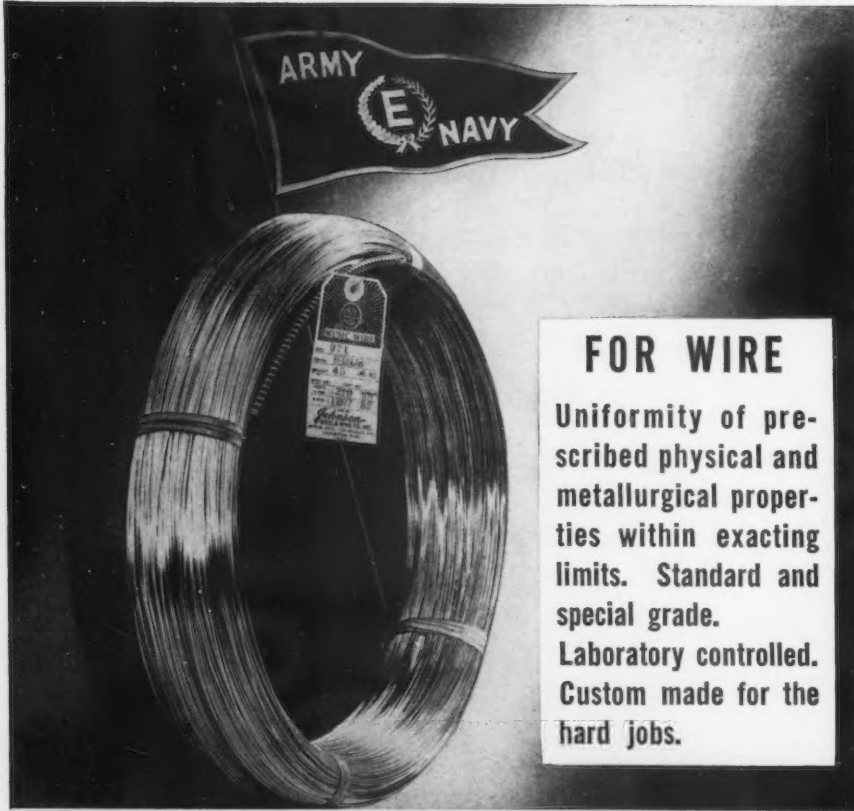
The temporary increase in freight rates is authorized in Amendment No. 73 to Supplementary Regulation No. 14. Authorization for ore owners to pass the increase along to ore buyers is contained in Amendment No. 2 to Maximum Price Regulation 113. The amendments are effective as of Dec. 1.

### Rolled Zinc Order Changed

•••Specific mention of special shapes, particular types of packing, special grades or finishes, plates produced from zinc alloys, and small quantity sales as "extras" for which charges may be made is among regulatory changes affecting rolled zinc products announced Dec. 3.

Maximum Price Regulation No. 124—Rolled Zinc Products—which became effective last May, established dollars and cents ceilings for the products covered. The changes are announced in Amendment No. 1 to the regulation, effective Dec. 9.

To guard against price increases, the amendment directs that cash



**FOR WIRE**

Uniformity of prescribed physical and metallurgical properties within exacting limits. Standard and special grade. Laboratory controlled. Custom made for the hard jobs.

**JOHNSON STEEL & WIRE CO., INC.**  
WORCESTER • MASSACHUSETTS

Branch Offices in American Industrial Centers

## PRICES

and trade discounts which prevailed Oct. 1, 1941, shall not be lowered. Another new feature calls for a report, within 30 days of the amendment's effective date, from producers of rolled zinc products showing:

- (1) Types of rolled zinc products produced during the period Oct. 1, 1940, to Nov. 1, 1942.
- (2) Extra charges for each type in effect Oct. 1, 1941.
- (3) Cash and trade discounts in effect for each class of purchaser on Oct. 1, 1941.

Another change giving specific effect to the original regulation's intent includes maximum prices for zinc plates and zinc engravers' plates in an enumerated list of products to whose prices permissible extra charges may be added.

Other changes made by the amendment are intended to permit continuance of recognized trade practices. Among these is the practice of some producers to make an extra charge for small-quantity sales. As amended, the regulation permits an extra charge on quantities smaller than 500 pounds, except for boiler and hull plates, for which small-quantity maximums are already in effect.

Charges for extras are not to exceed those in effect Oct. 1, 1941.

### Gears Go Under Order 136

••• Maximum prices for gears, pinions, sprockets and speed reducers—integral parts of machines—have been incorporated in the OPA's over-all regulation for machinery. Effective Dec. 11, gear and speed reduction items of all types will be priced under Maximum Price Regulation No. 136, as amended (machines and parts and machinery services). Previously manufacturers of these items were covered by a separate schedule titled Maximum Price Regulation No. 105 (gears, pinions, sprockets and speed reducers).

### Ferrosilicon Prices

••• Eastern and Western producers of ferrosilicon will operate on an equal basis insofar as freight allowances are concerned, the OPA announced Dec. 2.

The manufacture of ferrosilicon is new to the West Coast, which formerly obtained its supply from the Eastern United States and from Norway. During March, 1942, base price period under the General Maximum Price Regulation,

## PERFORATED METALS

### ORNAMENTAL

Any Metal

Any Perforation

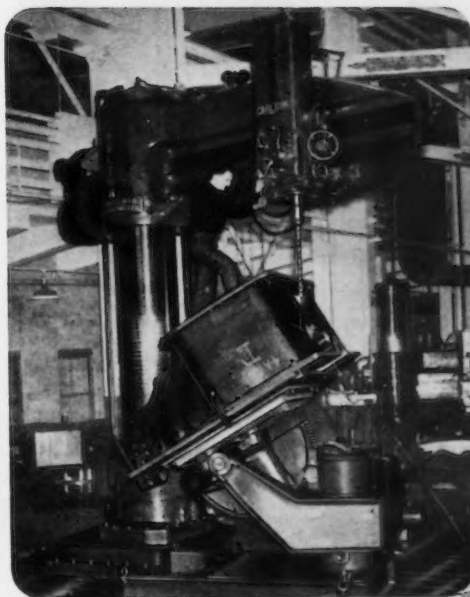
For INDUSTRIAL purposes a great variety of sizes and shapes of perforations are required, ranging from very fine to as large as 6" or more in diameter. We are equipped to supply all standard perforations in all kinds and thicknesses of metals.

ORNAMENTAL patterns are covered by our grille catalog. If interested, we hope you will send for it. There are attractive patterns for different uses.

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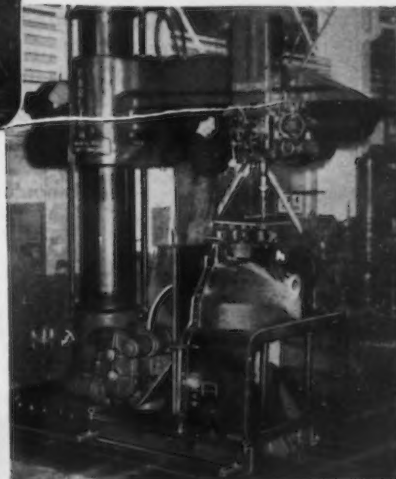
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### One Set-up on a C-F Positioner

—permits drilling from all sides, at any angle

Designed to revolve and tilt weldments so that all sides can be welded "down hand," C-F Positioners are today being used not only for welding, but for holding and positioning work for many different machining operations. Coming in sizes and capacities to carry work weighing up to 30,000 lbs., adjustable for height and capable of turning or rotating work completely around and tilting it at any angle (up to 135° off horizontal), these versatile positioners are reducing the number of set-ups required for many jobs.



(1) Drilling Angle Hole on side and (2) by tilting Positioner 90° and revolving table, "straight" holes are drilled on all 4 sides and in top.



Write for Bulletin WP 22 showing C-F Positioners as used to permit down hand welding on all surfaces of weldment with one set-up.



CULLEN-FRIESTEDT CO.,  
1303 S. KILBOURN AVE. CHICAGO, ILLINOIS



the greater part of ferrosilicon was sold f.o.b. Niagara Falls, N. Y., with freight allowed in an amount not exceeding freight to St. Louis.

In Amendment No. 70 to Supplementary Regulation No. 14 to the General Maximum Price Regulation, OPA provides that the maximum price of a West Coast seller shall include an allowance for actual freight which need not exceed freight from Niagara Falls to St. Louis plus the federal tax

on this freight, which will become effective Dec. 1, 1942.

The amendment affects producers in Washington, Oregon, and California and is effective Dec. 8.

### Glycerine Prices Cut

• • • OPA announced Dec. 6 that through voluntary agreement the six big manufacturers of glycerine would reduce their price 1 cent a pound on all sales to the government.

### OPA Interprets 3% Freight Tax

Washington

• • • OPA on Tuesday issued an interpretation to OPA supplementary Order 31 which refers to Price Schedule 49-resale of iron and steel products of Nov. 26 effecting a 3 per cent tax on transportation. OPA says that the tax is to be treated as though it were a freight rate increase in the same manner as the actual freight increase of 6 per cent effective last March was handled.

The general rule as it relates to schedule 49 is that the tax must be absorbed by the steel reseller on all purchases made by him to replenish his stocks, but may be added to the freight rates used by him in computing selling prices on his own deliveries.

On sales in the jobber's own city this means:

1. He can not reflect in his own resale price the tax paid by him on shipments from the steel mill wherever the schedule provides that his maximum delivered price is his own April 16, 1941 price, except that, (2) where the maximum price is determined by the lowest combination, as provided in the schedule, the tax may be added to the freight rate used in computing the lowest combination price, except that (3) where a seller's April 16, 1941 price is the same as the formula ceiling price established by the schedule, as in pipe and tubing, or where the schedule permits in lieu of an April 16, 1941 price a formula ceiling price, as on merchant wire products, the seller may add the tax on the freight rate used in the computation under the formula.

On sales outside the jobber's own city, this means that on any sales in which less than carload or carload freight is a component of the maximum delivered price, the tax may be added to the freight rate used in arriving at the maximum delivered price. It was pointed out, however, that where a seller's price on April 16, 1941 was built up on a price f.o.b. a city other than his own city, plus freight from that city to seller's warehouse, the tax may not be added to the freight rate used in computing the seller's own April 16, 1941 price. Instead, the freight rates in effect on that date must be added.



Stearns Drill Stand Magnet

The STEARNS Drill Stand Magnet, a profitable investment for steel and iron fabricators. Provides greater accuracy in drilling, saw hole cutting, etc. . . . increases operator output with less fatigue.

Fits any standard old man stand, easily attached, holds with tenacious grip in any position. Will cut your fabricating costs.

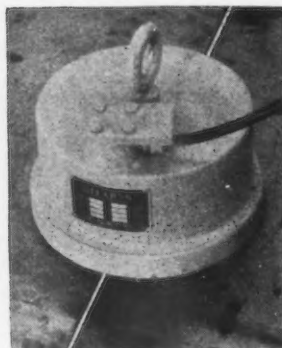
STEARNS Holding Magnet or Magnetic Clamp holds plates in alignment for lap welding quickly, safely, economically, a difficult job made easy. Feel free to consult us on fabricating problems. We may be able to help you get smoother, faster production.



Lifting Magnets

Rectangular Lifting Magnets in various sizes for moving sheets, rails, billets, etc.—fast, efficient and low cost. The link shown is extra, for spreader bar.

Write for literature and further details on these units.



Stearns Holding Magnet

## STEARNS MAGNETIC MANUFACTURING CO.

635 S. 28th St.

Milwaukee, Wis.

SEPARATORS—CLUTCHES—BRAKES—DRUMS—MAGNETS



## Order on Alloying Elements Issued by WPB for Conservation

Washington

••• Designed to conserve alloying elements, such as cobalt, molybdenum, tungsten, vanadium, chromium and nickel, WPB last week issued Order L-223, restricting deliveries of hard-facing material to orders rated AA-5 or higher and also restricting its use for maintenance and repair purposes to a specific list of essential types of equipment.

The order also limited the use of hard-facing material for new products to those specifically permitted.

Delivery of hard-facing material with a preference rating lower than AA-5 is permitted only if it is to be used for research work or field tests. However, no producer can deliver or receive more than 100 lb. per month for such purposes. Inventories are limited to 60 days' supplies.

Producers are required to file monthly reports, beginning with January, to WPB on Form PD-733, 734 and 735.

### Detroit CMP Session Develops Many Angles

Detroit

••• A meeting here Dec. 1 to explain the new Controlled Material Plan attracted about 2000 industrialists. Here are scattered notes, which may be of interest, on some of the many subjects explored in the session:

Class B products are, for the most part, stock room items—bolts, screws, bearings, motors, etc., sold to many different customers and hence also involves such items as farm machinery sold to different customers. Bolts, nuts, screws, rivets and bearings will be estimated on an industry basis rather than requiring individual bills of materials for all requirements.

When a mill is loaded with orders to the point it cannot make deliveries within a specified time, it can turn down any order from any consumer (contractor). In that case, the consumer advises the CMP branch with which he is

doing business, which undertakes and guarantees to find him a source for his material.

Questions are to be written to the regional offices of WPB on whether or not any product is in the Class B list, when there is a question. For instance, radiator might be a house, auto or airplane radiator. Standardized procedure of this sort on questions as to Class B listing will enable Washington to make final determination in all cases and preserve uniformity of decision.

In figuring gross weight on materials applications, rejected and scrap material estimates should be included on the basis of normal expectancy.

Warehouses will be classed as suppliers—the industrial division will supply warehouses on the basis of requirements in their special parts of the country.

Cutting tools are considered operation supplies in CMP.

Excess inventories must be reported by all to the Materials Redistribution Branch of WPB.

It is quite possible that the 75-day delivery—the time in which mills can make delivery, starting 15 days before the beginning of the month specified and extending to the end of the following month after specified month—will be tightened somewhat. Naturally, mills will seek to make deliveries during the month specified rather than the 15 days before or the 30 days afterward, but advantage of this procedure is flexibility. However, impairment of manufacturing schedules in consumer plants may necessitate narrowing of this 75-day gap.

CMP code numbers should be used for uniformity in all orders.

A hypothetical case was cited in which a producer needs 100 lb. of special steel a month to get out his production. This particular type of steel was not stocked by warehouses. Suggestion was made that the consumer should apply to the regional office to get authority to buy a minimum rolling of that special steel.

Prime consumers will not physically handle the material for sub-

consumers unless they desire to.

Consumers seeking a change of the status of their goods from Class B to Class A should apply to the industrial division involved; if seeking change from Class A to Class B, they should contact the claimant agency involved.

Job shops not working more than 60 days ahead, should file their estimates on the basis of past normal expectancy needs.

### How PRP Units May Obtain Additional Quantities

••• After filing or receiving back the regular PD-25A for the next quarter, with its stated Section H requirements, a PRP Unit frequently receives new or expanded war orders. These often necessitate the ordering of additional kinds or quantities of materials, both for the quarter covered by the regular PRP certificate and for one or more quarters beyond. (Section "H".)

1. In the case of expanded orders, or orders for new products which can properly be produced along with the applicant's normal products, the appropriate procedure is:

(a) For the quarter covered by the regular PD-25A, to file PD-25F for additional requirements. This, because PD-25F is a type of PRP certificate which validates the receipt of materials in the same way as the regular PD-25A certificate.

(b) For the advance quarters, to file a new or supplementary Section "H". The quantities entered in must in all cases be additional to those appearing in the original Section H filed, and must not be the aggregate of both requirements.

In filing this supplementary Section H, it will be necessary only to file the Section H and the authorization sheets of the PD-25A form. The Filing should be accompanied by a letter giving full explanation of the new requirements.

### Construction Order Changed

••• Several changes were made Dec. 5 by WPB in the construction Conservation Order L-41 which controls most types of civilian construction. The major amendments include the following changes:

Construction of railroad tracks is exempted from the provisions

of L-41. Buildings, tunnels, overpasses, underpasses or bridges, however, are still covered. Applications for laying trackage already are handled by the Transportation Equipment Division and today's change was made to eliminate unnecessary paper work required by the additional authorization of the administrator of L-41.

Agricultural construction incident to the erection or installation of machinery or equipment, which is now controlled by Limitation Order L-170, is exempted, in order to remove a second unnecessary control on farmers by order L-41.

Construction of facilities by the communications industry is exempted from the provisions of L-41. Adequate control of such construction is maintained by blanket Preference Rating Orders P-130 and P-132. Consequently, it is not necessary for the Bureau of Construction, which administers L-41, further to control construction or extension of communication facilities, except buildings.

### 3000 At Chicago CMP Session

#### Chicago

• • • More than 3000 metal plant executives jammed the Civic Opera House auditorium and the Palmer House ballroom here last week to hear WPB officials explain the workings of the new Controlled Materials Plan.

J. L. Overlock, regional director of WPB, who has since announced his resignation from WPB, J. A. Krug, deputy director general director for priorities control, Harold Boechenstein, director of CMP division, Stanley Adams, special assistant to Krug, and an array of

*Questions and answers on CMP, obtained at the Chicago meeting, will be found in this issue on Page 133.*

local priorities experts pooled their talents in explaining how the plan will work. At a luncheon meeting E. L. Ryerson, chairman of the board of Inland Steel Co. and Brig. Gen. T. S. Hammond, chief of the Chicago ordnance district addressed a luncheon meeting.

Mr. Ryerson, discussing reports of an easier steel situation told the executives that nobody had any facts to cover such a statement. However, it is probable that the answer to that and many other problems will be available once CMP becomes effective.

"CMP will give the answer shortly," he said, "and we will know positively whether or not we will have steel for more civilian uses."

Gen. Hammond said that "we in the Chicago ordnance district have every hope that CMP will place the materials where greatest military and civilian needs require and exist."

### Sees Paper Work Eased

• • • Harold Boeschstein, director of the CMP division, said Dec. 6 that manufacturers who will operate under CMP have no cause for uneasiness on the amount of paper work to be required of them before allotments of material for the second quarter of 1943 are made.

"While the time-table calls for submission by the seven claimant agencies on Jan. 1 of their second quarter requirements for controlled materials, it is not planned in the meantime to burden industry with impossible demands for information," he said. "Through PRP applications and from other sources we have on hand data on which it is possible to base sound estimates for many items. No prime contractor should submit a bill of materials unless specifically requested to do so by his source of allotment."

### Action on Electric Motors

• • • A purchaser of an electric motor must show that the horse power of the motor he is applying for is no greater than that required to do the job, according to a provision in Conservation Order L-221, announced Dec. 4, effective Dec. 10.

Officials of the general industrial equipment division pointed out that it has been the practice of industry for many years to apply greater motor capacity than necessary for the job to be done. As a means of stopping this practice, the order applies certain measurements by which the actual power requirements may be related to the horse-power of the motor applied for by the purchaser.

L-221 prohibits the delivery or acceptance of motors, unless they comply with certain standard specifications and are of the simplest practicable, mechanical and electrical design. It also requires

the purchaser to certify and show reason why he must have a motor of a special type; and it restricts the use of such special types to the conditions and the purposes for which they are required. For example, it limits the use of explosive proof motors to hazardous locations.

One of the important conservation provisions in the order applies to both motors and generators. It requires the applicant to certify that he has made every reasonable effort (1) to adapt idle motors or generators in his possession, (2) to obtain used ones for his purpose, and (3) to repair or recondition his existing equipment.

### New Portable Tools Order

#### Washington

• • • Taking the form of an enabling act, WPB last Friday issued Order L-216, which empowers the Director General for Operations to issue schedules for standardization and simplification of all kinds of portable tools, including chucking equipment, saws, vises and machine tool accessories. It was said that the order was issued to relieve the bottleneck developing in the supply of universal portable tools.

The order also authorizes the issuance from time to time of schedules prescribing the preference ratings for sales or deliveries of such tools.

Schedule I and its appendix, attached to the order, establish standardization and simplification practices with respect to universal portable electric tools. It lists the tools that are affected by the order, the sizes and the models in these sizes, which may be manufactured and limits the length of the cable or electric cord to be used to carry power to such tools.

### Control Over Graphite

#### Washington

• • • Made effective when issued last Friday, WPB Conservation Order M-61, as amended, brought about complete control over distribution and use of graphite. No person may put into process for any purpose whatever any strategic graphite except with specific authorization by WPB. Madagascar flake graphite alone was covered by the previous order.

No person except a jobber may



deliver or accept delivery of any crucible or any other product containing strategic graphite without specific authorization. Preference ratings will hereafter have no bearing on delivery of crucibles containing strategic graphite.

### Stove Makers Aided

Washington

• • • Unrestricted use of iron and steel to manufacture coal and wood burning stoves was permitted by WPB last Thursday to producers whose factory sales in the 1940-41 base period were less than \$2,000,000 and whose plants are not located in a labor shortage area. The measure which temporarily, until Jan. 31, 1943, removed quotas of manufacturers in this class, was embodied in Order L-23-d and was issued to enable persons to replace fuel oil heating equipment.

In February and March quotas established by the original order are again applied. Allowable consumption of iron and steel for the 60-day period may equal that of the full quarterly quota as defined in the order.

At the same time, an amendment to Order L-23-c, made provision for clearance of factory and foundry space for stove manufacture by shifting of production schedules from cooking ranges to stoves. This was for the purpose of permitting manufacturers to fulfill Federal Public Housing Authority contracts for coal and wood cooking ranges, including combination ranges in the current quarter. Producers are also authorized to complete the manufacture of any permitted type of range for which all parts had been completed or were in process of manufacture on Nov. 9.

### Domestic Mica Controlled

Washington

• • • Allocation control over domestic mica began Dec. 10, as a result of amended Order M-101 issued Dec. 3. The amended order broadens the definition of "strategic mica" to include a number of lower grades, not previously covered, which have recently found wide use in essential production.

The allocation control forbids any person to deliver any unfabricated strategic domestic mica to any person except the Colonial

Mica Corp. (an agent of Metals Reserve Co.) unless with the specific authorization of WPB.

### P-126 Extended

Washington

• • • The period of time within which the provisions of Preference Rating Order P-126, assigning preference ratings for emergency service to refrigerating and air conditioning machinery and equipment, has been extended to Dec. 15, by the issuance of Amendment No. 4 to P-126.

### Lithium Ores Allocated

• • • Lithium ores were put under complete allocation and use control Dec. 5 by Conservation Order M-253. Beginning immediately, no supplier may deliver and no consumer may accept delivery of or use lithium ores except with specific authorization of WPB. This includes stocks of ore which have

been produced and are now in private or Government hands.

### L-201 Limits Tire Chains

Washington

• • • Production of a limited amount of tire chains for commercial vehicles is permitted by Order L-201 as amended last Saturday. The revision removed the general prohibition and provided the manufacturers of tire chains and tire chain parts for commercial vehicles with the same amount of material permitted under the original order but allowed them to use 25 per cent of this amount in new chains.

### T.C.I. Celebrates Dec. 7

Birmingham

• • • In celebration of Pearl Harbor Day, the first railroad carload of coal was loaded and shipped Dec. 7, at the Short Creek (Number 19) mine of the Tennessee Coal, Iron & Railroad Co. Work on this mine was started in March 1942.



"I'm sorry to have to report that the books show an average profit of 1.79% on all our government contracts . . . now, gentlemen, do we stay and face the music . . . or take it on the lam?"



## Here Are More Questions and Answers

### Chicago

••• The following questions concerning the Controlled Materials Plan were asked by metal plant executives at a meeting on CMP held here last week at the Palmer House. The answers were given at the meeting by WPB officials.

Readers are cautioned that many details of the plan are still in the formative stage and the answers to some questions are necessarily largely estimates of what likely will be done. It is stressed that the plan is being introduced gradually and until a plant is notified by its prime contractor or a claimant agency to use CMP, it is necessary to continue operating under existing priority regulations.

The CMP booklet referred to in several questions is a booklet issued by WPB on Nov. 14 which gives general instructions on bills of materials. Copies of this booklet may be obtained from WPB regional offices. See the War Priorities Guide, *THE IRON AGE*, Oct. 8, 1942, for addresses of regional offices. Other questions and answers concerning CMP were published in *THE IRON AGE*, Dec. 3, 1942, p. 120. The latter were unofficial answers at a New York meeting.

Q.—Is there any difference in urgency or priority between Class B and Class A producers?

A.—There is no difference. The distinction is largely in the nature of the products each makes and is intended to simplify administration of the plan.

Q.—Can you give us a more detailed breakdown of some of the classifications in Group B, as for instance what is meant by "consumers durable goods?"

A.—A more detailed statement of items in Class B list is being formulated in Washington which will remove many of these ambiguities.

Q.—Who will have to file bills of material?

A.—Bills of materials may be needed in some areas, but not in others, depending upon the quality of data currently on hand at WPB. In some areas, past usage, or engineering or manufacturing estimates may be adequate for estimating needs. There may be some requests for bills of materials shortly, but an effort will be made to avoid asking for such bills in the first period due to lack of time to properly complete them. There will be no new bills of material required on products for which bills have not thus far been provided in the first "go-around."

Q.—Who issues requests for bills of material?

A.—In the future all requests will clear through WPB, which will determine if a bill of material is the proper basis for obtaining the required information. Such bills will be restricted to areas where they are absolutely necessary and where they can be accurately employed. It is important that a bill of material request should have a Bureau of the Budget number in the upper right hand corner and also a CMP number. Prime consumers are not to ask for bills from their secondary consumers until they are properly authorized to do so by a request from a claimant agency. Certain bills of material are being circulated in this area (Chicago) by prime consumers. It is unfortunate that these are in circulation. All such bills can be ignored unless they have a Bureau of the Budget number on them. Also, it is not necessary to fill out a form for a time beyond the expiration date given on each form.

Q.—How are repairs and maintenance covered under CMP?

A.—They are not. An administrative order is in process

of formulation for this purpose which will be similar to past P orders. Some areas may have to fill out an application similar to PRP, but for other areas sufficient data are available for estimating repair needs. Adequate notice of such requests for applications will be given. Those who provide parts and assemblies and other materials will probably receive a priority rating with some limitation as to amounts of tight materials which can be purchased.

Q.—How will construction be handled under CMP?

A.—That problem is still being worked out by WPB. Material will continue to be received for projects much as in the past. WPB is working with a list of 20,000 projects to determine which of the claimant agencies will be responsible for each project. When that is determined, the specified agency may then ask for a statement of requirements probably on a form similar to PD-28.

Q.—When a form of material on the controlled material list is fabricated into another form also on the list, is it classed as an A product, or it is to be considered a raw material, as for example steel strip formed into tubing?

A.—It is still a controlled material, if it is a form listed on bills of material.

Q.—In the freight warehouse business where you can't carry inventory, do you write up a bill of material for each individual material?

A.—Contact the transportation division of WPB and request an application for an allotment of material.

Q.—When and where will applications for Class B-2 producers be available?

A.—Don't worry about this until you receive a request for an application from the proper industry division of WPB.

Q.—Will CMP affect steel warehouses any differently than PRP? How will CMP affect inventories and quotas?

A.—Steel warehouses will be treated the same as a supplier of controlled materials and will receive instructions from CMP branch relative to material they will have available in their warehouses.

Q.—What consideration is given to minimum procurable requirements?

A.—Such quantities will be obtainable through warehouses. Where such a purchasing problem exists it should be noted on the application.

Q.—How are shipments of steel controlled to jobbers, if allotment numbers cannot be extended?

A.—Warehouses will have three types of business: There will be a certain amount of minimum orders which he will furnish without an allotment number. There will be certain other orders up to a maximum size which can be delivered through allotment numbers. Then there will be certain designated warehouse materials, for instance aluminum, where an agency may set up an earmarked stock, subject to its own regulations for its distribution. Warehouses will receive material from mills according to determination of the CM branch of WPB.

Q.—How will the hardware distributor order merchandise through the wholesaler or manufacturer?

A.—He will do as he is doing now, file PD-IX. CMP has nothing to do with the distribution of finished products. So far as this question is concerned, hardware plants do not know there is a CMP.

Q.—How about plants making a great diversity of products for war use?

A.—When a plant requires a wide variety of parts, such as small stampings, machine parts, etc., for a widely diversified line of products, they are to be considered as Class B when no category can be found at present to cover

## on New Controlled Materials Plan . . .

this product. Or they should contact their industry division for a determination of whether or not to classify their product as Class B.

**Q.—Can a secondary manufacturer of Class A products purchased by all claimant agencies be given an allotment covering all requirements?**

**A.—**Such allotment numbers can be basketed.

**Q.—In view of future reports, what records must be kept and how should they be broken down?**

**A.—**Don't know in detail yet what records must be kept other than forms shown in CMP booklet. This information will be given later.

**Q.—Are we to wait until we are told before we begin to get figures for the bills of material, or should we get the figures and expect to be told to send them in?**

**A.—**Wait. You may never be asked for it.

**Q.—As a secondary consumer, must we continue to ask our customers for specific end use on steel, as well as copper, orders during the interim period?**

**A.—**During interim period, you may be asked for end use, but ultimately the information in bills of material and applications will give all required data.

**Q.—Steel, copper and aluminum are items to be allocated, but we must put all the CMP materials on the detail and summary bills of material. Must we put in some other form a request for priority authorization for purchase of CMP items other than steel, copper and aluminum?**

**A.—**There are three types of products. An A product for which you put in your requisition for copper, aluminum and steel and on the allotment form you receive a preference rating for buying other than controlled material. On your B product with a schedule, the same thing happens, except that you go to the industry branch for the allotment of controlled material and receive a preference rating for buying other than controlled materials. On a B product without a schedule, you use a form similar to PD-25A as you do now for other than controlled material and you will receive a preference rating and quantitative allotment for other than controlled material.

**Q.—Will it be possible under CMP to continue our policy of maintaining a stock of completed components for emergency use, this stock to be continually replaced on the basis of the priority on which they were received?**

**A.—**If this refers to a B product, the answer is yes.

**Q.—Will form PD-26A be eliminated?**

**A.—**When CMP is in full effect, around July 1, 1943, it will probably be eliminated. In the meantime, continue to use it.

**Q.—Will gages and machine fixtures be classified as operating supplies?**

**A.—**Yes, if in your usual bookkeeping they are considered as such.

**Q.—How about inventories?**

**A.—**Unlike PRP, inventories are not a part of CMP. It will be handled by a separate agency.

**Q.—Will a company be able to ask for a rehearing based on a change in the demand of his prime contract (say something similar to a PD-25X)?**

**A.—**If a specification is changed, the prime contractor or claimant agency will have to provide the necessary material out of their allotment to take care of the changes specified by them.

**Q.—Will public utilities supplying both the public and industry have to file a bill of material?**

**A.—**At present, utilities will not have to file bill of ma-

### Instruction Booklet on Controlled Materials Plan

• • • Demand for detailed information on the Controlled Materials Plan, as published in recent issues of THE IRON AGE, is sufficiently great to warrant reprinting the data in a 16-page booklet, titled, "How to Operate Under the Controlled Materials Plan." Copies are available at 25c. each. Please send stamps with orders for four or less. Address THE IRON AGE, Reader Service Department, 100 E. 42nd Street, New York.

terial information for maintenance, repairs and operating supplies.

**Q.—What happens to your allotment if it is not delivered within 75 days? Is your subsequent allotment increased?**

**A.—**If an order is not delivered at the end of that period, then the mill must advise the CM branch of WPB and the claimant agency. The agency will then decide whether it is to be delivered at a subsequent period or cancelled.

**Q.—Since a supplier of controlled materials may take up to 60 days to ship material, beyond the consumer's specified delivery date, what date should be specified for a needed delivery of say May 1?**

**A.—**Specify May 1. There may be some delays in the interim period while readjustments are being made, but afterwards, since mills will be assigned only according to their capacity, the material will probably be delivered on the date specified, subject to the usual variation due to the need for mills to basket orders for small quantities until enough for a mill run is collected. Don't give a date such as April 1 as a hedge, when you really need it on May 1, for this would be a misstatement and subject to a fine of \$10,000 or two years in jail. It is good practice to give the mill a little leeway in specifying delivery dates.

**Q.—Do Class B producers do anything until WPB requests something?**

**A.—**Do nothing until industry branches ask for either a bill of material or an application form.

**Q.—How strict are the deadlines of the plan as given in the WPB booklet on CMP?**

**A.—**The time schedule given in the booklet was the original time schedule, which may have to be modified in conformity with our ability to get information, to get our organization together. You are still operating under PRP and will receive authorizations under PRP for the first quarter. There is a possibility these authorizations may be extended into the second quarter, if CMP is not advanced enough to make it possible to shift into CMP.

**Q.—Will anybody be using allotment numbers before July 1?**

**A.—**Yes, some programs are going to be put under CMP in next 30 days in order to obtain practical experience in the manner in which CMP will work.

**Q.—How will CMP affect present allocations, of say, copper?**

**A.—**For the time being, copper allocations will be handled as at present. CMP will eventually absorb the present system.

**Q.—How do we get an adequate inventory to carry on special jobs which can't be scheduled in advance?**

**A.—**Your application forms provide for two kinds of information. The amount of material which you are going to put into use against a schedule and the amount of



material you desire to purchase against a schedule. It is possible that sometimes the latter figure may exceed the first by reason of the necessity of filling up production pipe lines, or inventory. When you are producing products which are specialized and cannot be put on a production schedule (these would probably be class B items) you would be asked to estimate your requirements in terms of past use, on a basis similar to the basis used in estimating PRP requirements and this would be allotted by the appropriate industry division. Any allotment made to you must take into consideration your necessary minimum operating inventory and for that reason your initial request draws a distinction between materials you purchase and materials you put into use.

*Q.—What about a plant making both class A and B products, but with the class A products representing only a minute portion of your output?*

*A.—Any producer may be both an A and B producer. If you are officially requested, in proper form, for data as a secondary consumer under class A, you will have to supply the information.*

(CONTINUED FROM PAGE 131)

### Laboratory Equipment

• • • Additional control over the purchase of laboratory equipment was put into effect by the issuance Dec. 5 of Limitation Order L-144, as amended. No purchaser of laboratory equipment shall be permitted to acquire an item valued at more than \$50 or any quantity of the same item to the value of more than \$50, without securing an authorization for such purchase. Application should be made on Form PD-620. Purchases authorized on the basis of this form will be assigned an AA-4 rating.

### Sulphuric Acid Allocated

• • • Sulfuric acid was placed under allocation control Dec. 5 through the issuance of Order M-257. However, deliveries of acid will not be prohibited subject to specific authorization as is usually the case with an allocation order. Instead, it will be possible

under the order to issue directions when and as needed, covering deliveries to be made and uses to be permitted or prohibited.

The order provides that all producers of sulfuric acid, and all others who deliver spent sulfuric acid, must file monthly reports covering shipments and production during the prior month, as well as a statement of estimated production for the current month. This is to be made on Form PD-601.

### Giant Blast Furnace Goes On in Russia

• • • Russia advises the United States that a giant new blast furnace, described as the biggest in all Europe, has gone into production at Magnitogorsk, a large industrial center behind the Ural mountains. The furnace is said to have a capacity of 1400 tons of pig iron a day. Its location, at Magnitogorsk, is nearly 800 miles from the war front.

## This Week's Priorities and Prices

**Metallurgical manganese ore** with a manganese content of 40 per cent or less by weight is exempted from price control by Amendment No. 1 to Maximum Price Regulation No. 248, effective Dec. 1. (OPA-T-365)

**Stainless steel** may be used in certain products needed by the armed forces under amended order M-126. (T-1302)

**Crown caps** made from scrap prior to Sept. 26 may not be used in excess of quotas established by order M-104 until all scrap now owned by brewers and bottlers has been fabricated into crown. (T-1317)

**Graphite** has been placed under complete control in amended order M-61. (T-1330)

**Iron and steel scrap** sellers were authorized to pass on to consumers the 3 per cent property transporta-

tion tax imposed under the 1942 revenue act, through Amendment No. 9 to Revised Price Schedule No. 4. (OPA-1217)

**Portable tools** have been ordered simplified and standardized in Order L-216 and Schedule 1 attached to it. (T-1327)

**Gear and speed reduction items** of all types will be priced under Maximum Price Regulation No. 136 as amended, effective Dec. 11. (OPA-1237)

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*For copies of above announcements address Office of War Information, Washington, giving announcement number as shown in parentheses after each paragraph. (For example, WPB-600 means announcement 600 issued by the War Production Board.)*

## Revisions to The Iron Age Priorities Guide

• • • The following data, together with all intermediate weekly revisions in THE IRON AGE, should be added to THE IRON AGE Priorities Guide published with the issue of October 8 to bring the Guide up to date.

#### "M" Orders:

**M-15-b...**Amended order limits consumers of reclaimed rubber to a 45-day working inventory, effective as of Sept. 1 (12-1-42).

**M-19...**Amended order places chlorine under straight allocation control (12-2-42).

**M-61...**Amended order puts graphite under complete control (12-4-42).

**M-101...**Amended order brings domestic grades of mica under control (12-2-42).

**M-126...**Amended order permits use of stainless steel in several products needed by the armed forces (11-30-42).

**M-253...**Order places lithium ores under complete allocation and use control (12-5-42).

**M-257...**Order places sulphuric acid under allocation control (12-5-42).

#### "P" Orders:

**P-98-c...**Permits sale of inventory stocks by one oil operator to another oil operator (12-1-42).

**P-126...**Amendment No. 4 (12-2-42) extends to Dec. 15 the time within which provisions of order are effective.

#### "L" Orders:

**L-23-c...**Amendment No. 5 (12-2-42) makes provision for clearance of factory space for stove manufacturers.

**L-23-d...**Order removes quotas of Class C producers in the stove industry temporarily (12-3-42).

**L-41...**Amendment relieves certain phases of construction covered under other WPB actions from coverage (12-5-42).

**L-144...**Amended order places additional control over the purchase of laboratory equipment (12-5-42).

**L-201...**Amended order permits production of a limited number of tire chains for commercial vehicles (12-5-42).

**L-216...**Order requires simplification and standardization of universal portable electric tools, including drills, grinders, right angle buffers, sanders, polishers, and saws (12-4-42).

**L-221...**Order establishes restrictions on types of electric motors that shall be manufactured (12-2-42).

**L-223...**Order restricts deliveries of hard-facing material to orders rated AA-5 or higher (12-2-42).

# PERSONALS

• **Alfred Marchev**, vice-president, has been named as general manager of the Republic Aviation Co.'s Farmingdale plant. Mr. Marchev joined Republic Aviation in February, 1942, as assistant to the president, and later became vice-president and assistant general manager. **Ralph S. Damon** relinquished the general manager's post to devote his full attention to supervision of the company's plants in the East and in the Mid-West.

• **William H. Knight** has been made director of sales and market research for the Elastic Stop Nut Corp. Mr. Knight has 20 years' experience in sales and marketing activities. He was formerly vice-president of Electric Household Utilities Corp., Chicago. Prior to that he was a sales executive for 13 years for the Firestone Tire & Rubber Co. of Akron, Ohio.

• **M. G. Huntington**, with the B. F. Goodrich Co. since 1923, has been named manager of the Washington office of the national sales and service division of the company. Mr. Huntington joined the Miller division of B. F. Goodrich directly from the University of Minnesota and after extensive experience in various sales capacities became advertising and sales promotion manager of the company's associated lines division. He later became sales manager of the special accounts department of the associated lines division and joined the national sales and service division in October of this year. In his new capacity he succeeds **K. D. Smith** who assumes new company duties with headquarters in Detroit, Mich.

• **L. R. Howes**, in the rubber industry since 1914, has been named sales engineer for the automotive and aeronautic departments of the B. F. Goodrich Co. national sales and service division with headquarters in Los Angeles.

• **Franz Wethly**, whose career as a designer and builder of by-product coke ovens has taken him around the world, has joined the Wilputte Coke Oven Corp. Mr. Wethly, until recently vice-president of the Otto Construction Co., came to this country in 1939 from

The Hague, Netherlands, where he directed the Dutch operations of the Otto interests.

• **C. B. Burmood**, formerly chief pilot for Chiang Kai-shek, Generalissimo of China, and a veteran pilot well known in international flying circles, is now a member of the B. F. Goodrich Company in charge of the company's flying



**JOHN HOWE HALL**, whose appointment as metallurgist for General Steel Castings Corp., Eddystone, Pa., was announced in this column, Nov. 26.

operations. Mr. Burmood joined the Akron company after service with the United States Ferry Command of which he became a member after four years in China.

• **Walter E. Gibson**, formerly advertising manager of the Swartzbaugh Mfg. Co., Toledo, Ohio, has joined the advertising staff of Detroit Rex Products Co., Detroit.

• **C. A. Babbitt** of Norton Co., Worcester, Mass., has been appointed field engineer for the territory comprising New York, New Jersey and Philadelphia.

• **E. O. Callander** has been appointed sales representative for General Electric wiring materials in Ohio with headquarters in Cleveland. Mr. Callander had been associated with General Electric Supply Corp., Toledo, for five years. Before that he was with Strong, Carlisle & Hammond, machinery distributors.

• **J. Kenneth Salisbury**, of the General Electric Co.'s turbine engineering department, was awarded the A.S.M.E. Melville Medal for his paper, "The Steam-Turbine Regenerative Cycle—An Analytical Approach," on Dec. 2 during the annual meeting of the society. Mr. Salisbury has been with General Electric since 1930 and with the turbine engineering department at the Schenectady Works since 1933.

• **Felix Doran, Jr.**, general manager of the Fleet Division of General Motors Corp., has been appointed assistant chief of the tank and vehicle section of the Supply Branch of the Tank-Automotive Center of the Ordnance Department, located at Detroit. He has been with General Motors for the past 23 years.

• **Harry D. Beutlich**, was named director of personnel and industrial relations for Willys-Overland Motors, Inc., Toledo. Mr. Beutlich was formerly director of industrial relations for Crosley Corp. and prior to that time was associated in a similar capacity for seven years with the Nash Division of Nash-Kelvinator Corp.

• **Don C. Streeter** has been appointed general sales manager of Reo Motors, Inc. He has been with Reo for 26 years in sales and service work.

• **W. P. Hopkins** has been appointed purchasing agent of the Tuthill Pump Co., Chicago. Mr. Hopkins was formerly assistant purchasing agent for the ordnance plant at Marion, Ohio, and prior to that, for the Illinois Central system.

## OBITUARY...

• **Roger Sherron**, president, the Harrington Co., Philadelphia, died Nov. 21.

• **Clayton O. Smith**, treasurer and general manager since 1919 of the O. S. Walker Co., Inc., died suddenly Nov. 17, aged 72 years. In 1893 he studied in the students' course of Westinghouse Electric & Mfg. Co. at Pittsburgh. He then went to New Brighton, N. Y., where he worked for a year for C. W. Hunt Co. Returning to Worcester in 1895 he was employed for five years by Norcross.



## November Steel Output Sets Record for 30-Day Month

• • • Production of 7,184,560 tons of steel ingots and castings during November represented the maximum production ever achieved in a 30-day month, according to a report by the American Iron and Steel Institute.

The November tonnage was below the October peak of 7,584,864

tons but was above the total of 6,960,885 tons produced in November, 1941.

During November, the steel industry operated at an average of 97.9 per cent of capacity as against operating rates of 101.1 per cent in October and 98.2 per cent in November a year ago when

capacity was smaller than it is today.

An average of 1,674,723 tons of ingots was produced per week during November, compared with 1,712,159 tons per week in October and 1,622,584 tons per week in November, 1941.

YEAR 1942										
Based on Reports by Companies which in 1941 made 98.5% of the Open Hearth, 100% of the Bessemer and 87.8% of the Electric Ingot and Steel for Castings Production										
Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January.....	6,328,128	95.4	490,864	86.0	305,930	96.3	7,124,922	94.7	1,608,335	4.43
February.....	5,791,813	96.7	453,543	88.0	275,700	96.2	6,521,056	96.0	1,630,264	4.00
March.....	6,574,701	99.1	493,294	86.4	324,916	102.3	7,392,911	98.2	1,668,829	4.43
1st Quarter.....	18,694,642	97.0	1,437,701	86.7	906,546	98.3	21,038,889	96.3	1,635,994	12.86
April.....	6,346,707	98.8	454,583	82.2	321,023	104.4	7,122,313	97.7	1,660,213	4.29
May.....	6,600,376	99.5	454,054	79.5	332,460	104.7	7,386,890	98.2	1,667,470	4.43
June.....	6,247,302	97.2	452,518	81.8	322,335	104.8	7,022,155	96.4	1,636,866	4.29
2nd Quarter.....	19,194,385	98.5	1,361,155	81.2	975,818	104.6	21,531,358	97.4	1,654,985	13.01
1st 6 months.....	37,889,027	97.8	2,798,856	83.9	1,882,364	101.5	42,570,247	96.9	1,645,545	25.87
July.....	6,350,047	95.7	453,684	79.6	345,093	96.3	7,148,824	94.5	1,617,381	4.42
August.....	6,420,496	96.6	467,313	81.8	345,642	96.3	7,233,451	95.4	1,632,833	4.43
September.....	6,297,201	98.0	437,950	79.4	331,933	95.7	7,067,084	96.5	1,651,188	4.28
3rd Quarter.....	19,067,744	96.8	1,358,947	80.3	1,022,668	96.1	21,449,359	95.5	1,633,615	13.13
9 months.....	56,956,771	97.4	4,157,803	82.7	2,905,032	99.5	64,019,606	96.4	1,641,528	39.00
October.....	6,757,696	101.6	461,895	80.9	365,273	101.7	7,584,864	100.1	1,712,159	4.43
November.....	6,378,661	99.1	458,426	82.9	347,473	99.9	7,184,560	97.9	1,674,723	4.29
December.....										4.42
4th Quarter.....										13.14
2nd 6 months.....										26.27
Total.....										52.14

Note—The percentages of capacity operated in the first 6 months are calculated on weekly capacities of 1,498,029 net tons open hearth, 128,911 net tons Bessemer and 71,682 net tons electric ingots and steel for castings, total 1,698,622 net tons; based on annual capacities as of Jan. 1, 1942, as follows: Open hearth 78,107,260 net tons, Bessemer 6,721,400 net tons, electric 3,737,510 net tons. Beginning July 1, 1942, the percentages of capacity operated are calculated on weekly capacities of 1,500,714 net tons open hearth, 128,911 net tons Bessemer and 81,049 net tons electric ingots and steel for castings, total 1,710,674 net tons; based on annual capacities as follows: Open hearth 78,247,230 net tons, Bessemer 6,721,400 net tons, Electric 4,225,890 net tons.

Bros., architects. In 1900 he went to the Norton Co., remaining there until 1919.

• **Dr. Frederick M. Becket**, a consultant to Union Carbide & Carbon Corp., New York, died Dec. 1. He was formerly president of Union Carbide & Carbon Research Laboratories, Inc., and former vice-president of Union Carbide Co., Electro Metallurgical Co., and Haynes Stellite Co., all units of Union Carbide & Carbon. He was 67 years of age. In 1940, Dr. Becket received one of the Modern Pioneers Awards of the National Association of Manufacturers. In 1929, Columbia University bestowed upon him the honorary

degree of Doctor of Sciences, and in 1934, McGill University conferred upon him the honorary degree of Doctor of Laws. For many years, he has been a contributor to technical publications in the chemical and metallurgical fields. Shortly after the turn of the century he originated and commercialized the fundamental principle of producing low-carbon ferro-alloys and alloying metals by reducing ores in the electric furnace with silicon instead of carbon. In his hands, silicon reduction yielded the first electric-furnace ferrovanadium produced in this country, and probably in the world; ferrotungsten of commer-

cial quality from the high-phosphorus domestic ores; ferromolybdenum direct from the natural sulphide; and, most important of all low-carbon ferrochromium. It was in 1918 that he developed the electric-furnace technique of producing ferrozirconium, used at that time for light armor plate, and now widely employed for improving quality steels.

• **Joseph V. Pauly**, president of the Ilasco Copper Tube & Products Co., Cincinnati, died Nov. 29. He was 56 years old. Mr. Pauly was president of the copper company for the past three years, following the death of the founder, John Stubbers.

# The Iron Age Critical Tool Locating Chart

Compiled from latest WPB data on available machine tool capacity.

CRITICAL TOOLS	REGIONAL OFFICES—WAR PRODUCTION BOARD											
	Total	No. 1 Boston	No. 2 New York	No. 3 Phila- delphia	No. 4 Atlanta	No. 5 Cleveland	No. 6 Chicago	No. 7 Kansas City	No. 8 Dallas	No. 10 San Francisco	No. 11 Detroit	No. 12 Minne- apolis
<b>BORING</b>												
Horizontal—3" Bar	50,738	7,136	8,996	6,112		10,532	6,219	1,364	1,673	2,918	5,328	430
" —To 4" Bar and Over	66,437	8,093	8,255	10,152		21,850	6,061	3,563	2,080	4,749	4,472	1,152
Vertical—54"	40,821	4,133	6,617	5,597		8,758	4,772	4,438	1,310	752	2,004	2,443
" —To 64"	58,006	4,429	6,836	9,840		14,029	4,858	4,148	3,852	6,153	2,237	1,624
" —To 120"	18,532	1,763	2,598	2,451		5,554	1,886	1,451	475	925	918	460
" —Over 120"	5,414		868	1,292		1,849	656	346	37	180	120	166
Jig Bore	34,077	7,779	6,749	2,701		5,213	2,908	808	318	2,463	3,776	269
Misc. Precision—Heald—Ex-Cell-O type	20,831	1,663	1,191	1,260		7,792	3,477	1,561	120	2,581	958	228
<b>BROACHING</b>	83,342	15,495	11,801	5,994		17,321	12,972	2,520	934	4,200	10,047	2,158
<b>DRILLING</b>												
Radial 6" to 8" Radius	74,474	7,214	8,452	11,071		23,268	7,919	5,210	3,396	2,369	4,149	1,526
Over 8" Radius	4,620	162	394	1,186		254	96	458	1,376	64	72	60
<b>DUPLICATING AND PROFILING</b>	35,908	12,258	10,039	3,379		3,798	2,197	333		1,569	2,099	138
<b>FORGING</b>												
Drop—Hammer—Board 100 lb. up	134,493	41,058	35,096	9,438		21,772	10,023	1,179	762	1,640	12,526	992
Steam 5000 lb. up	15,122	2,670	1,145	1,532		4,595	535		50	172	3,255	1,068
Press—Forging—Steam Hydr. 500 ton	7,111	1,232	1,626	48		2,561	1,163	216		92	163	
<b>GEAR CUTTING</b>												
Gear Hobbers—48" and up	26,227	2,566	1,933	3,260		7,435	2,774	1,981	1,395	1,454	2,771	608
Bevel Gear Cutters	54,639	11,441	5,976	7,062		14,035	6,661	1,857	624	2,419	4,060	604
<b>GRINDERS</b>												
Centerless	34,909	7,595	2,743	3,568		6,743	4,285	1,478	72	2,592	5,827	
External Cyl.	439,242	102,522	76,937	39,667		64,005	49,148	25,023	5,359	22,432	39,017	15,207
Internal Cyl.	152,444	29,170	17,271	13,121		22,456	19,159	12,220	5,327	13,390	15,537	4,793
Thread	5,271	1,233	274	813		642	184		168	775	1,132	
<b>LATHES</b>												
Engine—24" Dia.—Over 60" c.-c.	235,695	34,757	37,271	30,467		47,355	24,516	14,967	16,841	13,322	7,521	8,578
" —Over 24" Dia.—To 60" c.-c.	87,762	14,223	16,795	9,534		15,374	10,593	8,653	2,316	3,806	3,821	2,642
" —Over 24" Dia.—To 96" c.-c.	148,084	19,185	24,136	15,453		31,734	13,090	15,237	8,332	10,773	5,537	3,557
" —Over 24" Dia.—Over 96" c.-c.	372,298	51,956	46,268	53,030		74,449	27,051	32,994	23,105	32,312	12,733	8,485
Turret—12" Dia. 2 1/2" Bar and up	104,072	16,345	26,179	13,277		20,234	10,196	4,994	1,163	2,211	7,141	2,452
" —To 24" Dia. 2 1/2" Bar and up	188,644	24,200	25,999	21,939		39,492	18,532	14,730	8,042	17,664	11,290	6,786
" —Over 24" Dia. 2 1/2" Bar and up	43,614	3,138	4,943	6,299		8,918	6,042	3,987	2,904	5,235	1,274	1,074
Automatic—12" Diameter	17,454	2,451	2,914	664		851	6,571	1,139	336	780	2,530	109
" —To 24" Diameter	18,243	2,529	1,933	336		1,731	1,541	402		4,579	4,136	1,061
" —Over 24" Diameter	2,237		498	48		168	1,473			50		
<b>SCREW MACHINES</b>												
Automatic—Single 1"	85,519	15,413	34,561	7,979		10,793	9,856	2,151	114	550	3,496	604
" —Single to 3"	77,961	13,907	10,718	9,227		16,756	14,463	3,622	648	4,174	4,060	486
" —Single—Over 3"	18,403	2,741	2,036	2,249		2,770	6,933	24	108	796	973	78
" —Multiple—To 3/4"	6,032	694	617	600		592	312				2,227	
" —Multiple—To 1"	104,886	20,496	15,914	11,209		17,870	18,393	3,613		2,649	13,939	804
" —Multiple—To 3"	77,439	12,091	9,392	10,155		16,778	13,097	4,133		3,022	7,732	1,039
" —Multiple—Over 3"	2,913	143	120	116		996	458				812	268
<b>MILLING</b>												
Standard Type—Horizontal—No. 3	249,675	45,066	45,990	22,516		44,897	29,668	15,104	7,229	13,888	17,973	7,364
" —Horizontal—Over No. 3	121,478	14,972	20,085	19,391		24,913	9,589	6,900	5,046	10,693	7,905	2,994
" —Vertical—No. 3	50,589	13,624	7,794	3,162		8,555	4,894	1,418	316	2,285	8,066	475
" —Vertical—Over No. 3	49,264	13,595	4,978	7,152		9,654	4,914	1,231	618	1,912	5,290	820
Mfg.—Horizontal—12" table width	34,657	10,742	7,988	1,393		4,079	5,224	976	232	1,005	2,258	770
" —Horizontal—Over 12" table width	21,045	2,751	2,174	913		5,532	5,172	756		1,279	1,963	505
Planer—Over 30" table width—slab mill	8,919	2,432	1,515	786		2,280	234	496	84	43	352	612
" —Over 30" table width—side spdl.	2,897	512	153	909		185	231	144	125	366		264
" —Over 30" table width—vert. spdl.	6,857	16,665	1,341	1,004		1,168	392		153		520	614
" —Over 30" table width—side and vert.	10,187	1,731	1,144	947		3,287	1,498	192		292	895	201
Misc. and Dia. Cutting—Heller Type	23,059	6,611	7,429	1,410		4,454	1,021	316		1,036	782	
<b>PLANERS</b>												
60" wide to 15'	13,156	808	1,470	2,229		3,525	1,786	1,094	814	476	664	280
60" wide, over 15'	5,336	717	645	830		735	767	633	284	277	230	168
Over 60" wide to 15'	3,707	502	630	1,054		678	168	202	37	96	144	196
Over 60" wide, over 15'	9,308	1,052	1,400	1,612		3,980	304	270	112	178	72	328
<b>THREADERS</b>												
External Mills	31,279	6,823	3,478	3,232		4,321	3,025	1,180	928	4,129	2,900	1,263
Internal Mills	3,286	66	209	417		902	1,140	216	336			
<b>TOTAL AVAILABLE HOURS</b>	3,597,806	625,330	580,708	405,071		694,145	402,192	213,143	114,954	213,770	259,708	88,785

The available critical tool hours per week here shown are based on an 168-hour week and represent usable tool hours subject to operating labor available. Reports are based on initial inspection of the plants concerned by engineers trained for this work. The War Production Board Field Offices are acting as clearing houses for all public or private contractors or agencies interested in using these facilities.

When making inquiries regarding the availability of these critical tool hours for specific jobs, communicate in detail with the Regional Supervisor, Critical Tools Service, in the WPB Region best located for your job. They are:

Region	Supervisor	Assistant	WPB Office
No. 1 Boston	R. F. Wood	H. H. Whitcomb	17 Court Street
No. 2 New York	J. J. Carroll	C. Philippi	122 E. 42nd Street
No. 3 Philadelphia	C. E. Reinicker	R. V. Hildans	1617 Penn. Blvd.
No. 5 Cleveland	C. J. Perrier	C. R. Griffith	Union Commerce Bldg.
No. 6 Chicago	S. C. Bloom	W. I. Buhl	20 N. Wacker Dr.
No. 7 Kansas City	W. A. Crooks	P. J. Leonard	Mutual Interstate Bldg.
No. 8 Dallas	B. P. Rhineford	W. E. White	4th Fl. Fidelity Bldg.
No. 10 San Francisco	M. Brookman	S. W. Liftchild	1355 Market St.
No. 11 Detroit	R. O. Cunningham	J. B. Shepard	7310 Woodward Avenue
No. 12 Minneapolis	E. H. Pitney		326 Midland Bk. Bldg.



# MACHINE TOOLS

... Sales, Inquiries and Market News

## All-Time Mark Set In October Output Of Machine Tools

Washington

... Marking an all-time high, United States production of machine tools in October, according to information given the War Department, amounted to approximately 30,000 units, of which about 22,500 units were received by American armed forces. Emphasis was placed on the need for continuation of the high production rate. It was pointed out that in the prosecution of a mechanized war, machine tool production cannot be permitted to become static or recede unless complete and continued superiority of material is assured. The department said that a national industry geared for war production is never completely "tooled up" because of constant changes in the theaters of operations.

While cancellation of machine tool orders occurs as requirements change, it was pointed out, a recent survey of existing orders placed by the Army, Navy and Maritime Commission indicated that the percentage of cancellations has been running less than 2 per cent of unfilled orders monthly, a loss which will be exceeded by new orders. The dollar value of machine tool production in 1942, it was stated, will show a 1300 per cent increase over the 1929-1938 yearly average, the backlog of unfilled orders placed by producers of war material now is \$1,012,000,000. The statement said that this represents approximately 7.5 months production by the entire machine tool industry.

Continuing efforts are being made to assure the most efficient utilization of existing equipment, the War Department said, but the demands of war production cause tools to wear out three times as fast as normally. Depreciation is accelerated by the increased use of untrained operators, it was pointed out.

The Department added:

"In addition to depreciation and breakage, the exigencies of war prohibit present curtailment of

machine tool production. Developments on the fighting fronts, dictate design changes which must be accomplished unless fighting tools of the Allied Armies are to become obsolete.

"Similarly, any increase in the strength of armor or the power of projectiles dictates still greater improvement in each. To meet the threat imposed by the German use of a flat-trajectory 88 mm. gun as an anti-tank weapon, it was necessary to convert a 3-in. high velocity anti-aircraft gun into an even better tank destroyer.

"Armor and armament on aircraft have been increased far beyond the standards common at the start of the war. The four-bladed propeller, recently announced by the British for use in the Spitfire, soon may become standard for fighter planes.

"Such changes as these all require new machine tools. Neither the fighting fronts nor technological development are ever static. Changes of front necessitate changes of equipment. The nation which lacks maximum production of machine tools soon lags dangerously far behind.

"Allowance must also be made for a reserve of critical types of machine tools to replace losses. Total unit requirements for 1943 may be less than for 1942 but more than half of the 1943 production capacity has already been preempted by the backlog of unfilled machine tool orders. Machine tool manufacturers are now being urged to make quickest possible deliveries in order that present assembly lines may soon be completed."

## Orders 45% of Shipments

Cincinnati

... Thinning of order books through cancellation during the month of November and so far this month has been slightly retarded and is not on the accelerated pace noted during October. Despite the reduction in orders through these cancellations, machine tool men indicate that they still have backlogs extending at least eleven more months at the present rate of production and that new orders,

while at a slower pace, are touching between 35 and 45 per cent of production. Reasons for cancellations, of course, are too generally well known, but chief among the reasons is the fact that many users were ordered under government pressure early in the year to make sure of delivery at least of a part of required tools.

No change in production figures are indicated during the current month, all plants still operating seven days with three shifts a day. Personnel problems, however, continue to be troublesome, as draft boards stiffen in their attitude toward occupational deferments.

## Order Boards Being Adjusted To Speed Tool Deliveries

Washington

... Rearrangement of schedules of machine tool manufacturers to spread the work and reduce excessive backlogs of orders, is being undertaken as the No. 1 job of George H. Johnson, new director of the WPB Tools Division.

Mr. Johnson, who assumed the position on Nov. 23, was faced with the problem of accelerating the production of machine tools needed for the aircraft program. One expedient, it was decided, would be to relieve certain companies of orders that could not be filled for many months and to reassign these orders to companies with backlogs of shorter periods. Some companies had backlogs of two years or more, while other had orders for as little as a few weeks. The purpose of the rearrangement of schedules will be to keep the backlogs as nearly even as possible.

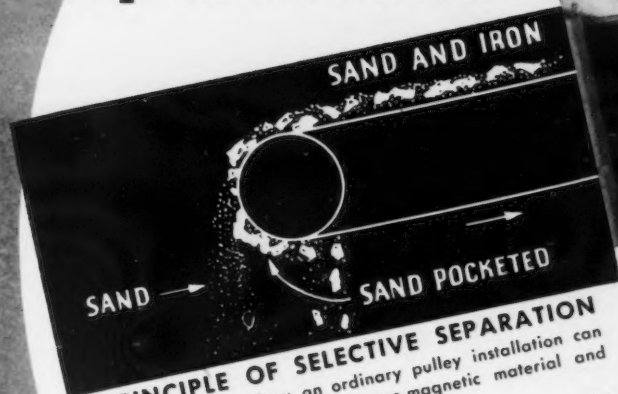
"Averaging out order boards will mean delivery of critical tools in less time," Mr. Johnson said. "We cannot afford to have any idle or retarded capacity among companies able to produce the tools we badly need. We want each firm to carry as much of the load as it can—and spreading the orders will make this possible.

"Machine tool production has reached \$130,000,000 a month, nearly twice the rate of this time last year, Mr. Johnson said.

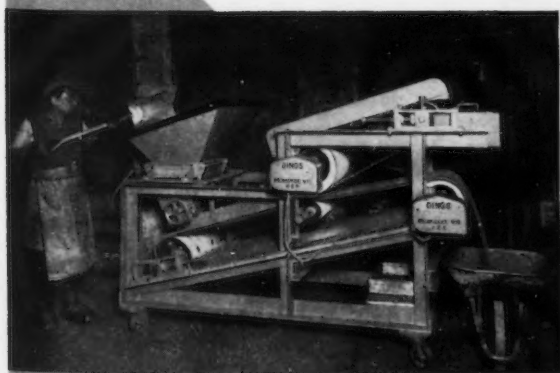
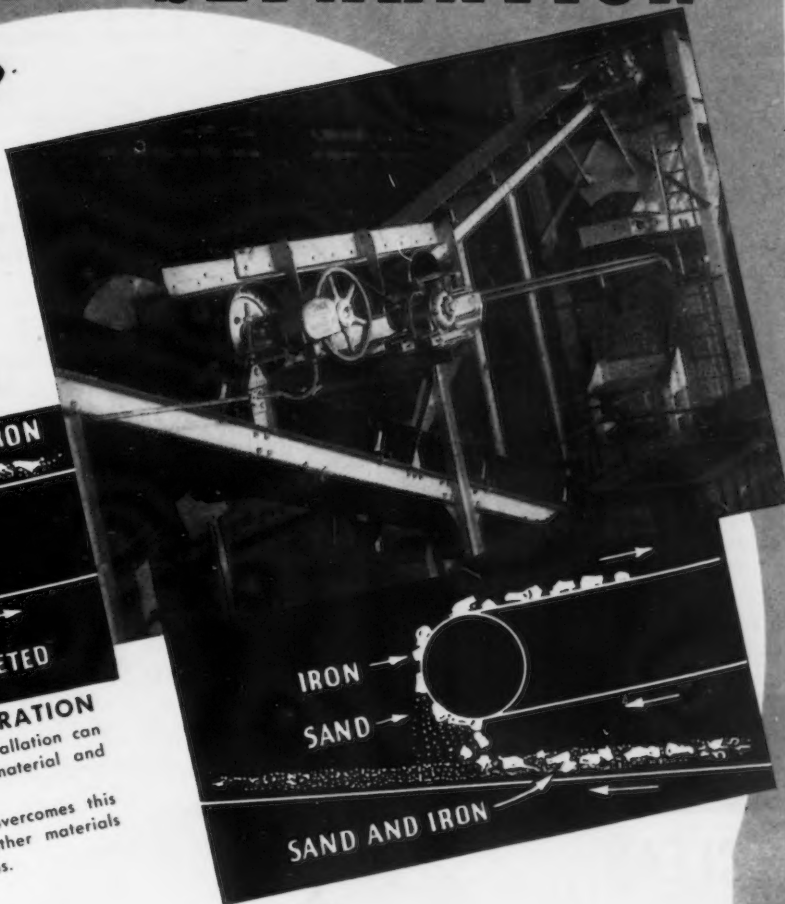
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# NON-FERROUS METALS

... Market Activities and Price Trends

## Bolivian Tin Exports

### Falling below Quota

... Exports of tin concentrates from Bolivia this year have so far been slightly below the 1941 rate. For the first ten months of the year, exports amounted to 33,287 tons, compared with 34,700 tons for the same period last year. This represents about 85 per cent of the 1942 quota of 46,768 set for Bolivia by the International Tin Control agreement. The price this year has been 60c. f.o.b. South American ports as against 48c. c.i.f. American ports in 1941.

Output by companies has been: Patino, 15,837 tons in 1942, 16,831 in 1941; Hochschild, 8469 tons in 1942, 9010 in 1941; Aramayo, 2389 tons in 1942, 2058 in 1941; medium producers, 3891 tons in 1942, 4571 tons in 1941; small producers, 2701 tons in 1942, 2230 tons in 1941. Aramayo and the small producers

were thus the only ones which have increased their exports. The best month this year has been March, with October second.

One Chilean report of late summer said that some Bolivian tin has been finding its way to the Axis, via Chile. No further reports on this have been forthcoming, however.

It is believed that the Belgian Congo will fall slightly behind its quota of 20,178 tons, and that Nigeria will exceed its 15,367-ton allotment. These three comprise the United Nations' sources of tin.

## Can Collections Improve Slowly, Clippings Less

... The detinning expansion program appears to be in a state of flux. Of the seven detinning plants contemplated a few months ago, only three are certain of construc-

## Shells from Battlefield, Firing Range, Salvaged

... Bullets shot at Fort Knox, Ky., over the past 20 years are now being reclaimed from firing range butts. The bullet mining is done by sluicing and by screening. Salvage from screened mud has averaged 100 lb. of metal per cu. yd.

Spent shells brought back from battlefields are to be sent to special inspection stations, under the copper recovery program to be set up by WPB for the Army and Navy. Shell cases which can be reused will be sent to shell loading plants. Others will be separated as to alloys, and consigned to brass mills for conversion. Enemy shells will, of course, also be salvaged, and after segregation by alloys will be remelted.

tion: New York's, Chicago's and Los Angeles'. The New York plant is under construction, and the Chicago plant will be started Dec. 15.

November receipts of old tin cans amounted to 12,000 tons, compared with 10,000 in October, 7000 tons in September and 2000 tons in July. Existing detinning facilities are about three times as great as November's receipts of cans, and before the salvage program can be considered at all successful, collections must reach the 30,000-ton a month mark.

Because of the curtailed tin plating program, receipts of tin plate clippings have fallen off. Production of plate next year is expected to amount to 2,600,000 tons, most of it electrolytic, compared with about 2,800,000 tons this year and 3,509,000 tons in 1941.

A ton of tin cans or plating scrap is now yielding about 23 lb. of tin and 1970 lb. of steel scrap. Seven pounds of metal are lost in the process.

## Canada Allocates Nickel

Toronto

... G. C. Bateman, metals controller, has announced that all nickel mill products made in Canada have been placed under direct al-

## CLEAN CASTINGS

### FASTER CHEAPER

with

## MARSCHKE GRINDERS



LOW FOUNDRY CLEANING COSTS depend upon smooth running abrasive wheels turning at correct speeds during all stages of wheel life—depend, in short, upon good machines. Eighteen features, including stiff spindles, controlled speeds, automatic wheel guards and grit-proofed bearing housings guarantee superb efficiency to users of Marschke Grinders. Marschkes are unequalled for **DEPENDABLE DURABILITY** under toughest, dirtiest foundry conditions. Marschke swing frame and floor stand Grinders are the economical machines for all cleaning and snagging operations.

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location. The order affects only those mill products containing 50 per cent or more by weight of nickel or nickel plus chromium, which are produced by any hot or cold working process. It does not apply to castings of nickel or nickel alloys.

#### Glass Saving Aluminum

• • • Silvered-glass reflectors for street and protective lighting equipment, such as searchlights and floodlights, have saved 360,000 lb. of aluminum, General Electric reports. The reflector and globe are blown as one piece, after which the reflector is silvered and a shatter-proofing copper backing applied. Reflectors designed with metal casings have no copper backings. Both types of reflectors have the silver baked between the layer of glass and a layer of porcelain enamel.

#### Refrigerator Makers Told Not to Hope for More Copper

• • • Any hopes of copper users that eventual adoption of steel shell cases will mean metal available for non-military uses were dispelled last week by George W. Meek, of WPB's conservation division. Mr. Meek told refrigerator producers at the annual meeting of the American Society of Refrigerating Engineers in New York that further Army and Navy needs will probably absorb the metal saved.

Collection of unneeded copper material from homes and public buildings will be recommended by the WPB Copper Branch, it is reported. However, after the experiences with aluminum and ferrous household drives, some officials are said to be leery of another such drive at this time.

Copper Recovery Corp. is reported to have moved 800 tons of copper in "as is" form on one day last week, the largest movement in any one day since the program began July 15.

General Conservation Order L-221, effective Dec. 10, is expected to save 7500 tons of copper a year. The new order deals with electric motors and generators, and provides for adaptation of idle units, use of used equipment, and repairing and reconditioning, in place of purchases of new equipment.

Brass foundries are about to be

#### WLB Appoints New Non-Ferrous Group

• • • The War Labor Board has created a non-ferrous metals commission to work on stabilization of pay and labor relations for 85,000 workers. Charles A. Graham, acting regional director of WLB in the Denver area, was named chairman, with John Gorsuch of Denver as vice chairman and the other public representative. Industry representatives are Henry M. Hartmen of Salt Lake City, and C. M. Thompson, president of Cap Rock Coal Co., Denver. The commission met last week in Denver.

surveyed by WPB, with a request for additional information on the foundries' ingot needs and stocks.

#### 3% Tax Affects Zinc

• • • Slab zinc sold on an f.o.b. East St. Louis basis will have the new 3 per cent transportation tax added just as though it were a freight increase, Allen Coe, chief counsel for the Non-Ferrous Metals Division of OPA, has announced. This makes a New York

price for prime western of 8.67c., brass special 8.92c., and intermediate 9.17c. High grade zinc is not affected, being on an official OPA ceiling of 9.25c. delivered anywhere in the U. S.

#### Pig Aluminum 14c

• • • For the first time in recent years, Aluminum Co. of America quotes a base price for pig aluminum. The price, 14c. lb., is 1c. less than the ingot aluminum price. In the past, pig aluminum has been on the market from time to time, but had lately been withdrawn. The aluminum pigs, which weigh 50 to 55 lb., are not as pure as ingot, and are used only by large companies which remelt the metal.

#### Odds and Ends

• • • Other non-ferrous news: A new metal refinery has been erected at Ibaque, Colombia, for exploitation of waste from the region's gold mines. Estimated daily capacity is 80 tons of commercial concentrates, including lead, zinc, gold, silver, mercury manganese and molybdenum.



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There is no guess work when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. If you will tell us how you use wire rope, we shall be glad to suggest the construction and type most suitable for your conditions.

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# SCRAP

... Market Activities and Quotation Trends

## Stop-Shipment Orders Are Reported Issued

Philadelphia

• • • Because of storage problems and unbalanced inventories of certain grades, some mills are reported forced to stop or restrict incoming scrap shipments.

While the mills' problems are entirely understandable, a pointed question is raised by dealers regarding the wisdom of this action as the current supplies of scrap instead of being held for later shipment to these consumers, are being allocated to Butler and Farrell, Pa., and other points in the Pittsburgh area—never to return.

The mills have been confronted with the problem of handling the largest quantities of light (and hard to handle) No. 2 scrap in their history and many of them have found their storage capacity, which was usually ample for ordi-

nary scrap, heavily overtaxed trying to accommodate the bulkiness of light household materials. In addition, difficulties in loading and handling have made movement of this type of material to the open hearths slower and costlier. Both factors have caused the mills to slow down on receipts of scrap or stop shipments completely for a time.

Unhappily, allocations which were turned down by local plants, were simply switched by Washington to mills in other areas and the scrap for this area is gone forever. Coupled with this fact is the actuality that the inflow of scrap has slowed to a near stop here and that yards are now in search of new supplies—which are not appearing very fast. The foreboding is that when yard inventories of these scrap dealers have been cleaned up—as they will be by allocations to other areas—little if any scrap will be available except

the usual flow of industrial and railroad scrap which has not proved sufficient in the past.

The steel industry's stockpile of iron and steel scrap was increased by more than 1,400,000 tons between April 1 of this year and Oct. 31, according to the American Iron & Steel Institute. A total of 3,254,000 tons of scrap was in inventory at steel plants on Oct. 31, which is equivalent to about 3½ weeks'

*Rosenwald hits at statements concerning scrap inventories, page 92.*

supply at the current rate of consumption. On April 1 only 1,794,000 tons of scrap were on hand at steel plants.

Sellers of iron and steel scrap were authorized by OPA Dec. 4 to pass on to consumers the 3 per cent property transportation tax imposed under the 1942 revenue act. The tax became effective Dec. 1.

At the same time, OPA announced several changes in allowable transportation charges to facilitate the movement of steel scrap from water shipping points.

The new provisions are contained in Amendment No. 9 to Schedule No. 4 and are effective as of Dec. 1.

The Amendment removes the "springboard" limitation on certain rail shipments of scrap from water shipping points where water movement has been suspended because of seasonal factors.

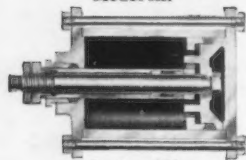
The amendment now provides that if the maximum shipping point price at any shipping point is computed by using a vessel rate, and due to seasonal factors water movement is unavailable, a consumer who could ordinarily receive scrap by water movement from that shipping point at a delivered price within the "springboard" limitation, may, so long as water movement is unavailable, absorb the all-rail transportation charges in the movement from that shipping point.

In another change, the amendment provides that where steel scrap is shipped by barge, the shipper may in certain cases add the published charges established at the dock, even though these

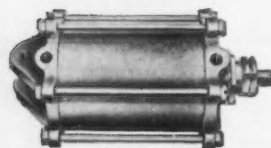
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Sectional View



Model BR

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# HANNIFIN PNEUMATIC CYLINDERS

charges exceed the allowances previously fixed in the schedule. It was found that water movement of scrap was impeded if the actual dock charges incurred by the shipper could not be passed on to the consumer. This resulted in diverting scrap to all-rail movement, inflating delivered prices and taxing railroad facilities.

Under the new amendment, however, a shipper using his own dock does not incur the published charges established at the dock, and therefore may add only such charges as were previously permitted by the schedule.

"If transportation from shipping point to point of delivery includes water movement other than by deck scow or railroad lighter, and tariffs establishing charges at the dock are published, charges incurred at the dock, but not to exceed the published tariffs, may be included in the delivered price," OPA explained. "If no such tariffs are published, or if the scrap is shipped over a dock owned or controlled by the shipper, the actual charges incurred at the dock, not exceeding 75 cents per gross ton, may be included in the delivered price, except that this maximum allowance shall be 50c. per gross ton at Memphis, Tennessee, \$1 at Great Lakes ports, and \$1.25 at New England ports.

**PHILADELPHIA**—Dealers here report that shipments have slowed noticeably not due to scrap shortages but to stop orders on shipments or strict scheduling of shipments by most mills. Stop orders have been issued by some mills due to the fact that large supplies of light No. 2 scrap have taken so much additional storage space that twice as much room has been used to store only a part of the usual tonnage. Strict scheduling of shipments has arisen from the same cause plus a desire to balance inventories for grade. This condition is considered an unhealthy one for the industry by dealers as excess scrap is being allocated west and will not be available later. In the meantime, scrap collections have fallen off and new supplies are not immediately in sight.

**CLEVELAND** — Supplies have been moving strongly into this area, with few exceptions. One mill, carrying between 1½ and 2 months' supplies on hand, expects no difficulties. However, allocations of scrap from the South and Southwest in substantial quantities were required by another large consumer in the district to maintain peak operations. Supplies in the Valley are not quite as comfortable. The Youngstown area is operating with about two weeks' supply and Warren with about a month's supply on hand. Surpluses of scrap which have accumulated in the Buffalo area are being allocated into the Valley districts as well as into Pittsburgh.

**BUFFALO**—Yard operators had a difficult time last week, with snow and cold combining with new losses in manpower to whittle down production. Despite the slow-up mill stocks remain ample. Scores of salvage piles in small Western New York communities are still intact because junkers lack means for moving the material to city yards. Cognizant of reports

that mill buyers were becoming "choosy" in other sections, leading yard men declared the condition did not exist in the Buffalo area.

**CINCINNATI**—With consumers apparently in a comfortable position for the time being, dealers indicate that pressure for scrap eased during the past week. The anticipated cold weather shortage is now believed averted.

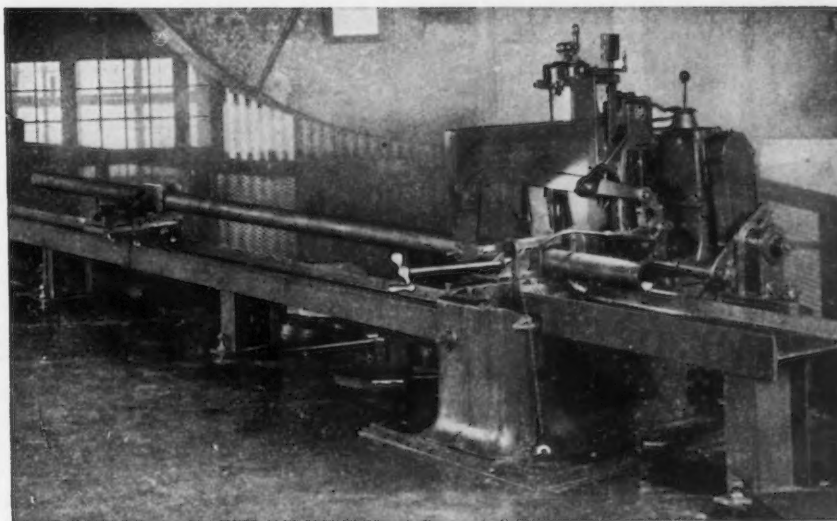
**TORONTO**—Receipts by dealers took a sharp drop during the week as the result of almost total suspension of deliveries from the rural districts, following severe snow storms that swept through southern Ontario and brought an end to scrap salvage campaigns. Offerings from local sources, especially war plants, continue in good volume. Dealers are carrying large yard stocks of scrap, and sorting of this material was more active during the week, and resulted in no falling off in shipments to consumers. It is estimated there are still some 25,000 tons to be brought out from the rural districts before the country is in the full grip of winter. Mills and electric furnaces have been stocking scrap for some time past and now are said to have sufficient accumulated, with regular deliveries, to carry them through the first two months next year. Slowing down in dealers' receipts of iron grades may soon necessitate in-

creased demand for pig iron to maintain foundry operations.

**BOSTON**—Despite a continued shortage of labor, New England yards are shipping quite a tonnage weekly, comparatively little of it salvaged scrap, however. Brokers report little difficulty in filling contracts although there are temporary periods of shortage of certain scrap such as breakable cast. Much confusion exists over allocations, disputes and price adjustments at consuming points.

**PITTSBURGH**—Scrap movement here continues unchanged from last week with allocations about as numerous. More household scrap is reaching steel mills as dealers attempt to make some headway in sorting and processing this material. Lessing J. Rosenwald, director, Conservation Division, WPB, urged scrap authorities here this week not to let up on any drive to bring in all the scrap possible so that a tremendous inventory can be built up for subsequent use if shortages develop. He is quoted at length elsewhere in this issue.

**BIRMINGHAM** — Continued improvement in the flow of all grades is experienced here. Some foundries, with a substantial supply on hand, are out of the market on cast grades.



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# SCRAP PRICES

## IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

### ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES

(All Prices Are Per Gross Ton)																					
BASIC OPEN HEARTH GRADES			BLAST FURNACE GRADES			Low Phos.			Heavy Structural and Plate			Cut Auto Steel Scrap									
(No. 1 Heavy Melting; No. 1 Hydr. Compressed Black Sheets, No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)			(Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)			Bar Crops, Punchings, Plate Scrap and Cast Steel			3 ft. and Under			1 ft. and Under Auto, Springs, and Crank-shafts		Alloy Free Low Phos. and Sulphur Turnings		Heavy Axle and Forge Turn. First Cut		Electric Furnace Bundles			
Unbaled* Machine Shop Turnings			No. 2 Busheling			Billet, Bloom, Forge Crops			3 ft. and Under			2 ft. and Under		1 ft. and Under		3 ft. and Under		2 ft. and Under		1 ft. and Under	
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton, Cleveland, Middletown, Cincinnati, Portsmouth, Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt., Ashland, Ky., Buffalo, N. Y., Bethlehem, Pa.; Kokomo, Ind., Duluth, Minn., Detroit, Mich., Toledo, Ohio, St. Louis, Mo., Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; M'Pittsburgh, Cal.; San Francisco Innequa, Colo., Seattle, Wash.	\$20.00 19.50 18.75 19.50 19.25 18.25 18.00 17.85 17.50	\$16.00 15.50 14.75 15.50 15.25 14.25 14.00 13.85 13.85 13.50	\$16.00 15.50 14.75 15.50 15.25 14.25 14.00 13.85 13.85 13.50	\$17.50 17.00 16.25 17.00 16.75 15.75 15.50 15.35 15.35 15.00	\$25.00 24.50 23.75 24.50 24.25 23.25 23.00 22.85 22.50	\$22.50 22.00 21.25 22.00 21.75 20.75 20.50 20.35 20.00	\$21.00 20.50 19.75 20.50 20.25 19.25 19.00 18.85 18.50	\$21.50 21.00 20.25 20.75 20.50 19.75 19.50 19.35 19.00	\$22.00 21.50 20.75 21.25 20.50 20.25 20.00 19.85 19.50	\$20.00 19.50 18.75 19.50 19.25 18.25 18.00 17.85 17.50	\$20.50 20.00 19.25 19.75 19.50 18.75 18.50 18.35 18.00	\$21.00 20.50 19.75 20.25 19.50 19.25 19.00 18.85 18.50	\$18.00 17.50 16.75 17.25 17.00 16.25 16.00 15.85 15.50	\$19.00 18.50 17.75 18.25 18.00 17.50 17.35 17.00 16.50	\$21.00 20.50 19.75 20.25 20.00 19.25 19.00 18.85 18.50						

# ... Composite Prices

Advances Over Past Week in Heavy Type; Declines in *Italics*.

(Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	Dec. 8, 1942	Dec. 1, 1942	Nov. 10, 1942	Dec. 9, 1941
Hot rolled sheets.....	2.10	2.10	2.10	2.10
Cold rolled sheets.....	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip.....	2.10	2.10	2.10	2.10
Cold rolled strip.....	2.80	2.80	2.80	2.80
Plates .....	2.10	2.10	2.10	2.10
Plates, wrought iron ....	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate: (Dollars Per Base Box)	Dec. 8, 1942	Dec. 1, 1942	Nov. 10, 1942	Dec. 9, 1941
Tin plate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00
Tin plate, electrolytic....	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30

Bars and Shapes: (Cents Per Lb.)	Dec. 8, 1942	Dec. 1, 1942	Nov. 10, 1942	Dec. 9, 1941
Merchant bars .....	2.15	2.15	2.15	2.15
Cold finished bars.....	2.65	2.65	2.65	2.65
Alloy bars .....	2.70	2.70	2.70	2.70
Structural shapes .....	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars.....	4.40	4.40	4.40	4.40

Wire and Wire Products: (Cents Per Lb.)	Dec. 8, 1942	Dec. 1, 1942	Nov. 10, 1942	Dec. 9, 1941
Plain wire .....	2.60	2.60	2.60	2.60
Wire nails .....	2.55	2.55	2.55	2.55

Rails: (Dollars Per Gross Ton)	Dec. 8, 1942	Dec. 1, 1942	Nov. 10, 1942	Dec. 9, 1941
Heavy rails .....	\$40.00	\$40.00	\$40.00	\$40.00
Light rails .....	40.00	40.00	40.00	40.00

Semi-Finished Steel: (Dollars Per Gross Ton)..	Dec. 8, 1942	Dec. 1, 1942	Nov. 10, 1942	Dec. 9, 1941
Rerolling billets .....	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars .....	34.00	34.00	34.00	34.00
Slabs .....	34.00	34.00	34.00	34.00
Forging billets .....	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp: (Cents Per Lb.)	Dec. 8, 1942	Dec. 1, 1942	Nov. 10, 1942	Dec. 9, 1941
Wire rods .....	2.00	2.00	2.00	2.00
Skelp (grv'd) .....	1.90	1.90	1.90	1.90

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 145 to 152 herein.

Pig Iron: (Per Gross Ton)	Dec. 8, 1942	Dec. 1, 1942	Nov. 10, 1942	Dec. 9, 1941
No. 2 fdy., Philadelphia..	\$25.89	\$25.89	\$25.89	\$25.84
No. 2, Valley furnace...	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti....	24.68	24.68	24.68	24.06
No. 2, Birmingham.....	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa...	25.39	25.39	25.39	25.34
Basic, Valley furnace...	23.50	23.50	23.50	23.50
Malleable, Chicago† ....	24.00	24.00	24.00	24.00
Malleable, Valley .....	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago..	31.34	31.34	31.34	31.34
Ferromanganese† .....	135.00	135.00	135.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.  
‡For carlots at seaboard.

Scrap: (Per Gross Ton)	Dec. 8, 1942	Dec. 1, 1942	Nov. 10, 1942	Dec. 9, 1941
Heavy melting steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh...	20.00	20.00	20.00	22.00
No. 1 cast, Philadelphia.	20.00	20.00	20.00	24.00
No. 1 cast, Ch'go.....	20.00	20.00	20.00	20.00

Coke, Connellsville: (Per Net Ton at Oven)	Dec. 8, 1942	Dec. 1, 1942	Nov. 10, 1942	Dec. 9, 1941
Furnace coke, prompt...	\$6.00	\$6.00	\$6.00	\$6.125
Foundry coke, prompt...	6.875	6.875	6.875	6.875

Non-Ferrous Metals: (Cents per Lb. to Large Buyers)	Dec. 8, 1942	Dec. 1, 1942	Nov. 10, 1942	Dec. 9, 1941
Copper, electro., Conn...	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis.....	8.25	8.25	8.25	8.25
Lead, St. Louis.....	6.35	6.35	6.35	5.70
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

## ... Comparison of Prices

FINISHED STEEL		PIG IRON		SCRAP STEEL	
Dec. 8, 1942.....	2.30467c. a Lb.....	.....23.61 a Gross Ton.....	.....\$19.17 a Gross Ton.....	.....\$19.17 a Gross Ton.....	.....\$19.17 a Gross Ton.....
One week ago.....	2.30467c. a Lb.....	.....23.61 a Gross Ton.....	.....\$19.17 a Gross Ton.....	.....\$19.17 a Gross Ton.....	.....\$19.17 a Gross Ton.....
One month ago.....	2.30467c. a Lb.....	.....23.61 a Gross Ton.....	.....\$19.17 a Gross Ton.....	.....\$19.17 a Gross Ton.....	.....\$19.17 a Gross Ton.....
One year ago.....	2.30467c. a Lb.....	.....23.61 a Gross Ton.....	.....\$19.17 a Gross Ton.....	.....\$19.17 a Gross Ton.....	.....\$19.17 a Gross Ton.....

HIGH		LOW		HIGH		LOW	
1942.....	2.30467c.,	2.30467c.,	2.30467c.,	\$23.61	\$23.61	\$19.17	\$19.17
1941.....	2.30467c.,	2.30467c.,	2.30467c.,	\$23.61, Mar. 20	\$23.45, Jan. 2	\$22.00, Jan. 7	\$19.17, Apr. 10
1940.....	2.30467c.,	2.30467c.,	2.30467c.,	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939.....	2.35367c., Jan. 3	2.26689c., May 16	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938.....	2.58414c., Jan. 4	2.27207c., Oct. 18	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937.....	2.58414c., Mar. 9	2.32263c., Jan. 4	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936.....	2.32263c., Dec. 28	2.05200c., Mar. 10	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935.....	2.07642c., Oct. 1	2.06492c., Jan. 8	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934.....	2.15367c., Apr. 24	1.95757c., Jan. 2	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933.....	1.95578c., Oct. 3	1.75836c., May 2	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932.....	1.89196c., July 5	1.83901c., Mar. 1	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931.....	1.99629c., Jan. 13	1.86586c., Dec. 29	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930.....	2.25488c., Jan. 7	1.97319c., Dec. 9	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929.....	2.31773c., May 28	2.26498c., Oct. 20	2.26498c., Oct. 20	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.



# Prices of Finished Iron and Steel...

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, reductions, and in most cases freight absorbed to meet competition. Delivered prices do not reflect new 3 per cent tax on freight rates.

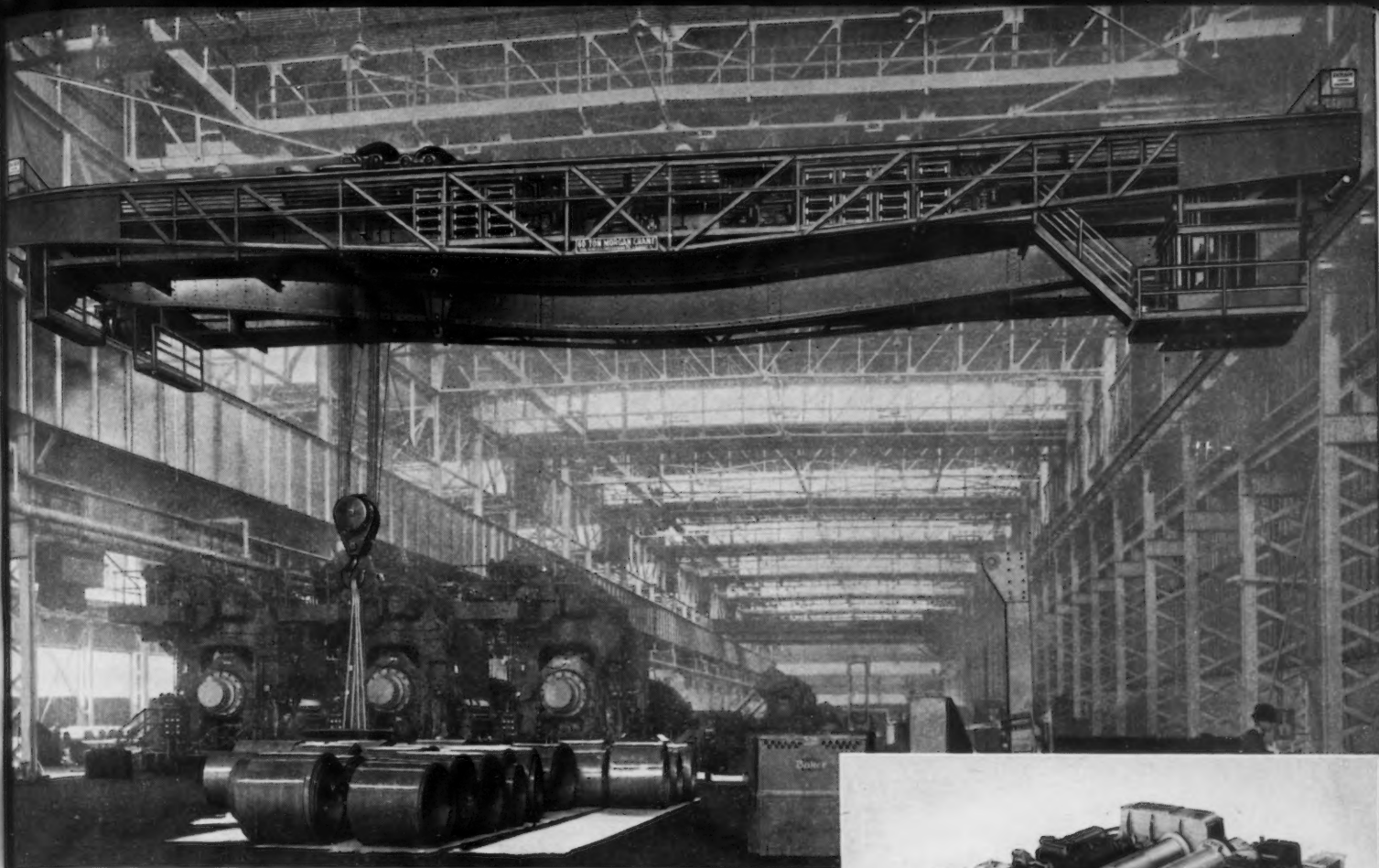
Basing Point ↓ Product →												10	DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
<b>SHEETS</b>															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled <sup>1</sup>	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.75¢	3.68¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢
Long ternes <sup>2</sup>	3.80¢		3.80¢									4.55¢		4.18¢	4.14¢
<b>STRIP</b>															
Hot rolled <sup>3</sup>	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.22¢	2.48¢	
Cold rolled <sup>4</sup>	2.80¢	2.90¢		2.80¢			2.80¢		(Worcester = 3.00¢)				2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢		(Worcester = 3.35¢)				3.07¢	3.33¢	
<b>TIN MILL PRODUCTS</b>															
Coke tin plate, base box	\$5.00	\$5.00	\$5.00						\$5.10					5.38¢	5.34¢
Electrolytic tin plate, box	\$4.50		\$4.50												
Black plate, 29 gage <sup>5</sup>	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ <sup>12</sup>			3.39¢
Mfg. ternes, special box	\$4.30	\$4.30	\$4.30						\$4.40						
<b>BARS</b>															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			(Duluth = 2.25¢)		2.52¢	2.80¢	2.27¢	2.51¢	2.49¢
Rail steel <sup>6</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.52¢	2.80¢			
Reinforcing (billet) <sup>7</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢ <sup>13</sup>	2.27¢	2.40¢	
Reinforcing (rail) <sup>7</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢ <sup>13</sup>	2.27¢		2.49¢
Cold finished <sup>8</sup>	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢			Bethlehem, Massillon, Canton = 2.70¢)				2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢		
									(Coatesville and Claymont = 2.10¢)						
<b>PLATES</b>															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢ <sup>11</sup>		2.47¢	2.65¢	2.33¢	2.30¢	2.155¢
Floor plates	3.35¢	3.35¢									3.72¢	4.00¢		3.73¢	3.69¢
Alloy	3.50¢	3.50¢							(Coatesville = 3.50¢)		3.97¢	4.15¢		3.71¢	3.60¢
<b>SHAPES</b>															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			(Bethlehem = 2.10¢)		2.47¢	2.75¢		2.28¢	2.22¢
<b>SPRING STEEL, C-R</b>															
0.26 to 0.50 Carbon	2.80¢			2.80¢					(Worcester = 3.00¢)						
0.51 to 0.75 Carbon	4.30¢			4.30¢					(Worcester = 4.50¢)						
0.76 to 1.00 Carbon	6.15¢			6.15¢					(Worcester = 6.35¢)						
1.01 to 1.25 Carbon	8.35¢			8.35¢					(Worcester = 8.55¢)						
<b>WIRE<sup>9</sup></b>															
Bright <sup>10</sup>	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester = 2.70¢)			3.10¢			2.94¢
Galvanized															
	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢					(Worcester = 3.30¢)			3.70¢			3.54¢
<b>PILING</b>															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.74¢

<sup>1</sup> Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. <sup>2</sup> Unassorted 8-lb. coating. <sup>3</sup> Widths up to 12 in. <sup>4</sup> Carbon 0.25 per cent and less. <sup>5</sup> Applies to certain width and length limitations. <sup>6</sup> For merchant trade. <sup>7</sup> Prices for straight length material only, from a producer to a consumer. <sup>8</sup> Functional discount of 25c. per 100 lb. to fabricators. <sup>9</sup> Also shafting. For quantities of 20,000 to 39,999 lb. <sup>10</sup> Carload lot to manufacturing trade. <sup>11</sup> These prices do not apply if the customary means of transportation (rail and water) are not used. <sup>12</sup> Ship plates only. <sup>13</sup> Boxed. <sup>14</sup> Portland and Seattle price, San Francisco price is 2.50c. <sup>15</sup> This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

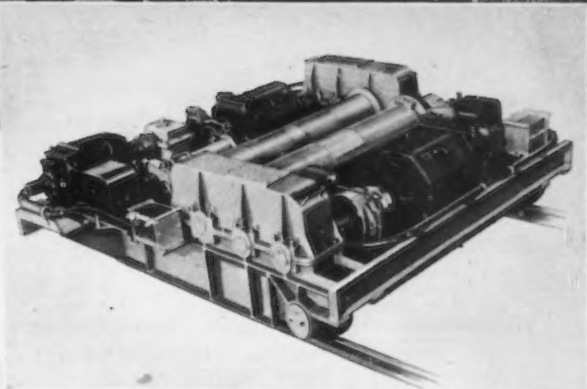
GOVERNMENT CEILINGS—Price Schedule No. 6 issued April 16, 1941, governs steel mill prices; Price Schedule No. 49 governs warehouse prices, which are on another page of this issue.

EXCEPTIONS TO PRICE SCHEDULE No. 6—On hot rolled carbon bars, Phoenix Iron Co. may quote 2.35c. at established basing points; Calumet Steel division of Borg Warner may quote 2.35c., Chicago, on bars from its 8-in. mill; Joslyn Mfg. Co. may quote 2.35c., Chicago base. On rail steel bars Sweets Steel Co. may quote 2.33c., f.o.b. mill. On hot rolled sheets, Andrews Steel Co. may quote for shipment to Detroit area on Middletown base. On galvanized sheets, Andrews Steel may quote 3.75c., at established basing points. On hot rolled strip, Joslyn Mfg. Co. may quote 2.30c., Chicago base. On plates, Granite City Steel Co. may quote 2.35c., f.o.b. mill, and Central Iron & Steel Co. may quote 2.20c., f.o.b. basing points. On shapes, Phoenix Iron Co. may quote 2.30c. established basing points and 2.50c. Phoenixville for export.

On rail steel merchant bars, Eckels-Nye Corp. may charge 2.40c. On tubing, South Chester Tube Co. may price Gulf or Pacific Coast all-rail shipments and shipments west of Harrisburg on basis of f.o.b. Chester. On lend-lease sales to eastern seaboard, Sheffield Steel Co. and Colorado Fuel & Iron Corp. may sell f.o.b. mill. SEMIFINISHED STEEL—Follansbee Steel Corp. may sell forging billets at \$49.50 f.o.b. Toronto; Continental Steel Corp. may sell Acme Steel Co. at \$34 for rerolling billets plus extras and freight; Ford Motor Co. may sell rerolling billets at \$34 f.o.b. Dearborn; Andrews Steel Co. may sell forging billets at \$50 at established basing points and slabs at \$41; Empire Sheet and Tin Plate may sell slabs at \$41 at established basing points and sheet bars at \$39 f.o.b. mill; on lend-lease sales Northwestern Steel & Wire Co. may charge \$41 per gross ton f.o.b. mill for rerolling billets; on lend-lease sales Wheeling Steel Corp. may charge \$36 per ton for small billets, f.o.b. Portsmouth and \$37 per ton for sheet bars f.o.b. Portsmouth; Laclede Steel Co. on semifinished sales for lend-lease shipped to eastern seaboard may use Chicago basing point prices f.o.b. Alton and Madison, Ill. ALLOY STEEL BARS—Texas Steel Co. may use Chicago base f.o.b. Fort Worth.



## MORGAN 60-TON, 100' 0" SPAN HEAVY-DUTY MILL TYPE CRANE



BUILT BY

MORGAN

*Engineering*

● Illustrated is one of two Morgan heavy-duty mill type cranes in a strip mill. Morgan superiority of design and construction is built into every part to insure many years of profitable service. They are equipped with fabricated welded trolleys and bridge trucks, hydraulic bridge brakes and anti-friction bearings throughout. Trolleys are of the gear box type using plain motors with flexible couplings. An auxiliary girder is provided for helping to support the cage, bridge motor and control units. Morgan engineers rely upon a highly skilled shop organization, modern equipment and progressive ideas in building heavy-duty mill type cranes.

**THE MORGAN ENGINEERING CO.**  
**ALLIANCE, OHIO. Pittsburgh, 1420 Oliver Bldg.**



DESIGNERS • MANUFACTURERS • CONTRACTORS • BLOOMING MILLS • PLATE MILLS • STRUCTURAL MILLS • ELECTRIC TRAVELING CRANES • CHARGING MACHINES • INGOT STRIPPING MACHINES • SOAKING PIT CRANES • ELECTRIC WELDED FABRICATION • LADLE CRANES • STEAM HAMMERS • STEAM HYDRAULIC FORGING PRESSES • SPECIAL MACHINERY FOR STEEL MILLS



# PRICES

## SEMI-FINISHED STEEL

For exceptions, see preceding page

### Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.25 higher; f.o.b. Duluth, billets only, \$2 higher. Delivered prices do not reflect new per cent tax on freight rates.

Per Gross Ton

Rerolling ..... \$34.00  
Forging quality ..... 40.00

Alloy Steel: Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton..... \$54.00

### Shell Steel

Per Gross Ton

3 in. to 12 in. .... \$52.00  
12 in. to 18 in. .... 54.00  
18 in. and over ..... 56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are \$2.25 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

### Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open hearth or bessemer ..... \$34.00

### Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared .. 1.90c.

### Wire Rods

(No. 5 to 9/32 in.)

Per Lb.

Pittsburgh, Chicago, Cleveland ... 2.00c.  
Worcester, Mass. .... 2.10c.  
Birmingham ..... 2.00c.  
San Francisco ..... 2.50c.  
Galveston ..... 2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

## TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

Base per lb.

High speed ..... 67c.  
Straight molybdenum ..... 54c.  
Tungsten-molybdenum ..... 57 1/2 c.  
High-carbon-chromium ..... 43c.  
Oil hardening ..... 24c.  
Special carbon ..... 22c.  
Extra carbon ..... 18c.  
Regular carbon ..... 14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

## CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

### Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

### Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F. Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

### Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

\*Includes annealing and pickling.

## NATIONAL EMERGENCY STEELS (Hot Rolled) Extras for Alloy Content

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT							Basic Open-Hearth		Electric Furnace		
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Chromium	Nickel	Molybdenum	Bars and Bar Strip	Billets, Blooms and Slabs	Bars and Bar Strip	Billets, Blooms and Slabs
NE 1330	.28/.33	1.60/1.90	.040	.040	.20/.35				.10c	\$2.00		
NE 1335	.33/.38	1.60/1.90	.040	.040	.20/.35				.10	2.00		
NE 1340	.38/.43	1.60/1.90	.040	.040	.20/.35				.10	2.00		
NE 1345	.43/.48	1.60/1.90	.040	.040	.20/.35				.10	2.00		
NE 1350	.48/.53	1.60/1.90	.040	.040	.20/.35				.10	2.00		
NE 6020	.18/.23	1.00/1.30	.040	.040	.20/.35			.10/.20	.45	9.00	.95c	\$19.00
NE 6022	.20/.25	1.00/1.30	.040	.040	.20/.35			.10/.20	.45	9.00	.95	19.00
NE 6339	.37/.42	1.30/1.60	.040	.040	.20/.35			.20/.30	.75	15.00	1.25	25.00
NE 8442*	.40/.45	1.30/1.60	.040	.040	.20/.35			.30/.40	.90	18.00	1.40	28.00
NE 6613	.12/.17	.70/.90	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25	.75	15.00	1.25	25.00
NE 6615	.13/.18	.70/.90	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25	.75	15.00	1.25	25.00
NE 6617	.15/.20	.70/.90	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25	.75	15.00	1.25	25.00
NE 6620	.18/.23	.70/.90	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25	.75	15.00	1.25	25.00
NE 6630	.28/.33	.70/.90	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25	.75	15.00	1.25	25.00
NE 6715	.13/.18	.70/.90	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.80	16.00	1.30	26.00
NE 6720	.18/.23	.70/.90	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.80	16.00	1.30	26.00
NE 6722	.20/.25	.70/.90	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.80	16.00	1.30	26.00
NE 6735	.33/.38	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.80	16.00	1.30	26.00
NE 6739	.35/.40	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.80	16.00	1.30	26.00
NE 6740	.38/.43	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.80	16.00	1.30	26.00
NE 6744	.40/.45	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.80	16.00	1.30	26.00
NE 6749	.45/.50	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.80	16.00	1.30	26.00
NE 6949*	.45/.50	1.00/1.30	.040	.040	.20/.35	.40/.60	.40/.60	.30/.40	1.20	24.00	1.70	34.00
NE 9255	.50/.60	.70/.95	.040	.040	1.80/2.20				.40c	8.00		
NE 9260	.55/.65	.75/1.00	.040	.040	1.80/2.20				.40	8.00		
NE 9262	.55/.65	.75/1.00	.040	.040	1.80/2.20	.20/.40			.65	13.00		
NE 9415	.13/.18	.80/1.10	.040	.040	.40/.60	.20/.40	.20/.40	.08/.15	.80	16.00	1.30c	\$26.00
NE 9420	.18/.23	.80/1.10	.040	.040	.40/.60	.20/.40	.20/.40	.08/.15	.80	16.00	1.30	26.00
NE 9422	.20/.25	.80/1.10	.040	.040	.40/.60	.20/.40	.20/.40	.08/.15	.80	16.00	1.30	26.00
NE 9430	.28/.33	.90/1.20	.040	.040	.40/.60	.20/.40	.20/.40	.08/.15	.80	16.00	1.30	26.00
NE 9435	.33/.38	.90/1.20	.040	.040	.40/.60	.20/.40	.20/.40	.08/.15	.80	16.00	1.30	26.00
NE 9437	.35/.40	.90/1.20	.040	.040	.40/.60	.20/.40	.20/.40	.08/.15	.80	16.00	1.30	26.00
NE 9440	.38/.43	.90/1.20	.040	.040	.40/.60	.20/.40	.20/.40	.08/.15	.80	16.00	1.30	26.00
NE 9442	.40/.45	1.00/1.30	.040	.040	.40/.60	.20/.40	.20/.40	.08/.15	.85	17.00	1.35	27.00
NE 9445	.43/.48	1.00/1.30	.040	.040	.40/.60	.20/.40	.20/.40	.08/.15	.85	17.00	1.35	27.00
NE 9450	.48/.53	1.20/1.50	.040	.040	.40/.60	.20/.40	.20/.40	.08/.15	.85	17.00	1.35	27.00
NE 9537*	.35/.40	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.60	.15/.25	1.20	24.00	1.70	34.00
NE 9540*	.38/.43	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.60	.15/.25	1.20	24.00	1.70	34.00
NE 9542*	.40/.45	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.60	.15/.25	1.20	24.00	1.70	34.00
NE 9550*	.48/.53	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.60	.15/.25	1.20	24.00	1.70	34.00
NE 9620	.28/.33	1.20/1.50	.040	.040	.40/.60	.40/.60			.80	16.00	1.30	26.00
NE 9635	.33/.38	1.20/1.50	.040	.040	.40/.60	.40/.60			.80	16.00	1.30	26.00
NE 9637	.35/.40	1.20/1.50	.040	.040	.40/.60	.40/.60			.80	16.00	1.30	26.00
NE 9640	.38/.43	1.20/1.50	.040	.040	.40/.60	.40/.60			.80	16.00	1.30	26.00
NE 9642	.40/.45	1.30/1.60	.040	.040	.40/.60	.40/.60			.85	17.00	1.35	27.00
NE 9645	.43/.48	1.30/1.60	.040	.040	.40/.60	.40/.60			.85	17.00	1.35	27.00
NE 9650	.48/.53	1.30/1.60	.040	.040	.40/.60	.40/.60			.85	17.00	1.35	27.00

\*Recommended for large sections only.

Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb., on finished products and \$54 per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton on semi-finished.

## ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh) Per Lb.

Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

## WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

Base per Keg

Standard wire nails	\$2.55
Coated nails	2.55
Cutnails, carloads	2.85
Annealed fence wire	Base per 100 Lb. \$3.05
Annealed galvanized fence wire	3.40
Woven wire fence*	Base Column 67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbed wire	70

\*15 1/4 gage and heavier. †On 80-rod spools in carload quantities.

## RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton ..... \$40.00  
Angle bars, 100 lb. .... 2.70

(F.o.b. Basing Points) Per Gross Ton  
Light rails (from billets) ..... \$40.00  
Light rails (from rail steel) ..... 39.00

Base per Lb.

Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	63-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond.

## ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00

# Engineered Production

## Turning Time Cut From 13 to 3 Minutes On Aircraft Engine Parts

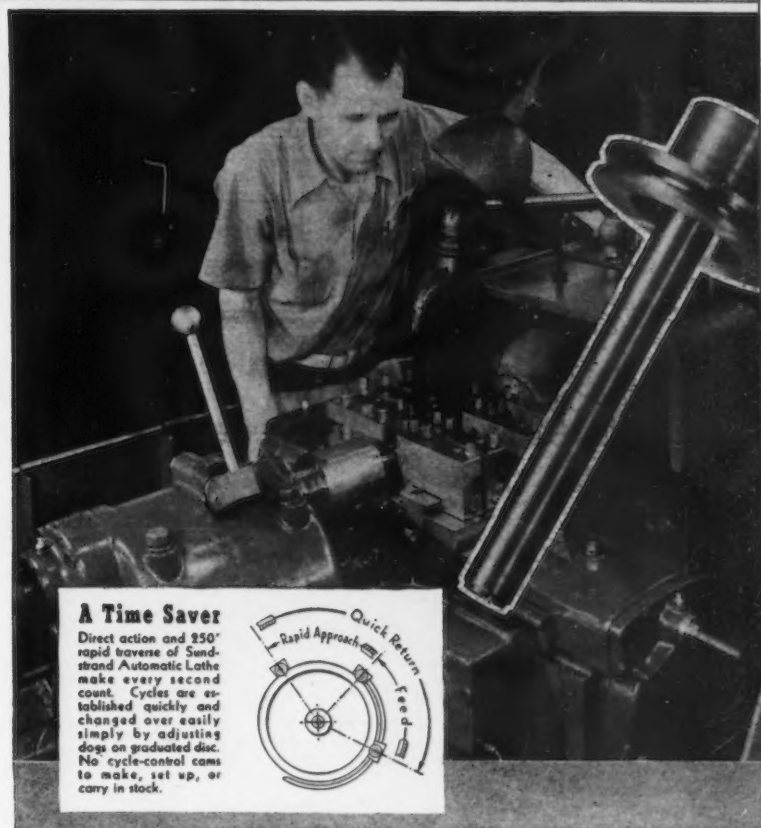
Turning tailshafts for aircraft engines, engineered production on Sundstrand Automatic Lathe shown at right reduced turning time from 13 minutes to 3 minutes for one operation; and makes similar time savings in two additional turning operations on these parts.

**High Production** — Exclusive Sundstrand advantages promote high production, with closely controlled accuracy; on turning these tailshafts in several sizes each requiring different set-ups.

**Quick Set-Up** — The operating cycles of Sundstrand Automatic Lathes are established quickly and easily by simple adjustment. Correct speeds and feeds are secured readily through pick-off gears. Sundstrand standard tool blocks and bases also facilitate rapid set-up and change-over from one job to another.

**Fast, Easy Operation** — It is easy to get operators for Sundstrand Automatic Lathes. No previous experience or special training is necessary. Operators merely change work-pieces and start automatic cycles, the machines do the hard work. An operator can usually run two or more Sundstrand Automatic Lathes easily.

**Other Work** — Parts for a great many other urgently needed products, besides aircraft engines, are being turned most effectively on Sundstrand Automatic



Lathes. Operation data sheets supplied promptly on request.

**Engineered Production** — Sundstrand Engineered Production Service is at your disposal for quick action in solving turning production problems. Use this service freely, especially on urgent war jobs. Be sure to send complete accurate information, with each inquiry.

*For You* ➔

This booklet describes Sundstrand adjustable cycle control, shown in panel above, and many other Automatic Lathe advantages. A copy will be mailed to you promptly on request. Write for it, today. Ask for Bulletin 507.



The Army-Navy "E" flag flies above the Sundstrand plant. Every member of our organization is proud of his part in earning this award. We are firmly resolved to scale new heights of production achievement, to maintain steadily our high standards of accuracy, and to cooperate closely with every effort directed towards victory for the United Nations.



## SUNDSTRAND MACHINE TOOL CO.

2539 ELEVENTH STREET, ROCKFORD, ILLINOIS, U. S. A.



# PRICES

## BOLTS, NUTS, RIVETS, SET SCREWS

### Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

### Machine and Carriage Bolts:

	Per Cent off List
1/2 in. & smaller x 6 in. & shorter	65 1/2
9/16 & 5/8 in. x 6 in. & shorter	63 1/2
3/4 to 1 in. x 6 in. & shorter	61
1 1/4 in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

### Nuts, Cold Punched or Hot Pressed:

	(Hexagon or Square)
1/2 in. and smaller	62
9/16 to 1 in. inclusive	59
1 1/8 to 1 1/2 in. inclusive	57
1 1/2 in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

### Semi-Fin. Hexagon Nuts U.S.S. S.A.E.

7/16 in. and smaller	64
1/2 in. and smaller	62
1/2 in. through 1 in.	60
9/16 to 1 in.	59
1 1/8 in. through 1 1/2 in.	57
1 1/2 in. and larger	56

In full container lots, 10 per cent additional discount.

### Stove Bolts

Packages, nuts loose..... 71 and 10  
In packages, with nuts attached..... 71  
In bulk..... 80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

### Large Rivets (1/2 in. and larger)

Base per 100 lb.  
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham.....\$3.75

### Small Rivets (7/16 in. and smaller)

Per Cent Off List  
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham.....65 and 5

### Cap and Set Screws Per Cent Off List

Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in. .... 64  
Upset set screws, cup and oval points 71  
Milled studs ..... 46  
Flat head cap screws, listed sizes.... 36  
Fillister head cap, listed sizes ..... 51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

## WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)

CITIES	SHEETS			STRIP		Plates (1/4 in. and heavier)	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 ga.)	Cold Rolled	Galv. (24 ga.)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled 2300	Hot Rolled 3100	Cold Drawn 2300	Cold Drawn 3100
Pittsburgh	\$3.35		\$4.65	\$3.60	\$3.20	\$3.40	\$3.40	\$3.35	\$3.65	\$7.45	\$5.75	\$8.40	\$6.75
Chicago	3.25	\$4.10	4.85 <sup>1</sup>	3.60	3.50	3.55	3.55	3.50	3.75	7.35	5.65	8.40	6.75
Cleveland	3.35	4.05	4.82	3.50	3.20	3.40	3.58	3.25	3.75	7.55	5.85	8.40	6.75
Philadelphia	3.55	4.05 <sup>5</sup>	4.85	3.51	3.31	3.55	3.55	3.85	4.06	7.31	5.86	8.56	7.18
New York	3.58	4.60 <sup>2</sup>	5.00	3.96 <sup>6</sup>	3.51	3.76	3.75	3.84	4.09	7.60	5.90	8.84	7.19
Detroit	3.43	4.30	4.84 <sup>1</sup>	3.68 <sup>4</sup>	3.40	3.60	3.65	3.43	3.80	7.67	5.97	8.70	7.05
Buffalo	3.25	4.30 <sup>1</sup>	4.75 <sup>4</sup>	3.82	3.52	3.62	3.40	3.35	3.75	7.35	5.65	8.40	6.75
Boston	3.71	4.68	5.11	4.16	3.46	3.85	3.85	3.35	3.98	4.13	7.77	6.07	8.91
Birmingham	3.45 <sup>3</sup>		4.75 <sup>1</sup>	3.70 <sup>3</sup>		3.55 <sup>3</sup>	3.55 <sup>3</sup>		4.48				7.28
St. Louis	3.39	4.24 <sup>2</sup>	4.99 <sup>1</sup>	3.74	3.61	3.69	3.69	3.64	4.02	7.72	6.02	8.77	7.12
St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84	7.44
Milwaukee	3.38	4.23 <sup>2</sup>	4.98 <sup>1</sup>	3.73	3.64	3.68	3.68	3.63	3.88	7.58	5.88	8.63	6.98
Baltimore	3.50		5.05	4.00		3.70	3.70	3.85	4.04				
Cincinnati	3.42	4.37 <sup>2</sup>	4.42 <sup>1</sup>	3.67	3.45	3.65	3.68	3.60	4.00				
Norfolk	3.85		5.40	4.10		4.05	4.05	4.00	4.15	7.69	5.99	8.50	7.10
Washington	3.60			4.10		3.80	3.80	3.95	4.10				
Indianapolis	3.45	4.25	5.01 <sup>1</sup>	3.75	3.28	3.70	3.70	3.60	3.97	7.67	5.97	8.72	7.07
Omaha	3.85		5.52 <sup>1</sup>	4.20		4.15	4.15	4.10	4.42				
Memphis	3.85		5.25	4.10		3.95	3.95	3.90	4.31				
New Orleans	4.05			4.30		3.90	3.90	4.10	4.60				
Houston	4.00			4.30		4.05	4.05	3.75					
Los Angeles†	4.95	7.15	5.95	4.90		4.90	4.60	4.35	6.60	9.55	8.55	10.55	9.55
San Francisco†	4.55	7.05	6.10	4.50		4.65	4.35	3.95	6.80	9.80	8.80	10.80	9.80
Seattle†	4.65 <sup>7</sup>		5.70 <sup>7</sup>	4.25		4.75	4.45	4.20	5.75		8.00		

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: <sup>1</sup> 500 to 1499 lb. <sup>2</sup> 400 to 1499 lb. <sup>3</sup> 400 to 3999 lb. <sup>4</sup> 450 to 1499 lb. <sup>5</sup> 1000 to 1999 lb. <sup>6</sup> 0 to 1999 lb. <sup>7</sup> 300 to 10,000 lb. At Philadelphia galvanized sheets, 25 or more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb., galvanized and cold rolled sheets, 750 to 4999 lb., cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. \* 12 gage and heavier, \$3.43. † Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

# NO INTERNAL DISSENSION HERE

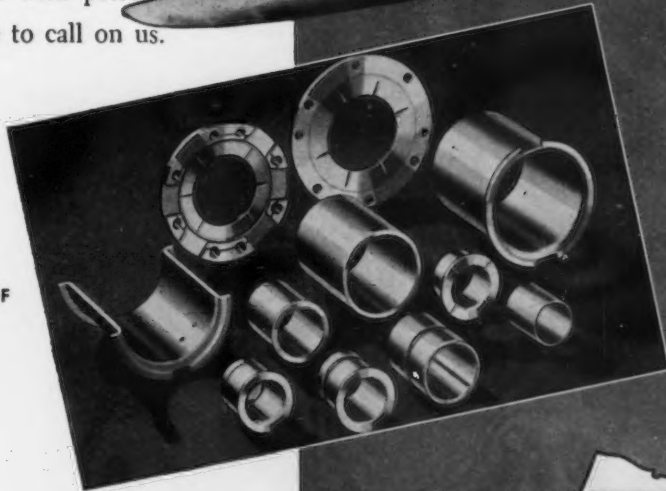
## Clutch and Valve "Harmony" Is Machined from OHIO SEAMLESS TUBING

● Even in quiet flight formation every part of the operating mechanism must do its intended duty surely and continuously. At some of the most vital spots in many types of fighting aircraft, this wear-and-tear responsibility is shouldered by a partnership between OSTUCO Tubing and accurate machining and finishing.

Two such vital parts are valve rocker shaft bushings and high ratio clutch gear bearings. Beyond meeting strict Army and Navy specifications, special care is taken in drawing and treating the tubing to provide properties which help in later operations. For this reason Ohio Seamless Tubing has earned a remarkably consistent record of low rejection percentages over a long period of years.

OSTUCO is acquiring brand-new experience through its manufacture of seamless tubing from new steels, to new specifications, for never-before applications in machines designed for offensive action on land, sea and in the air. If this experience can help you with present problems or long-range planning, be sure to call on us.

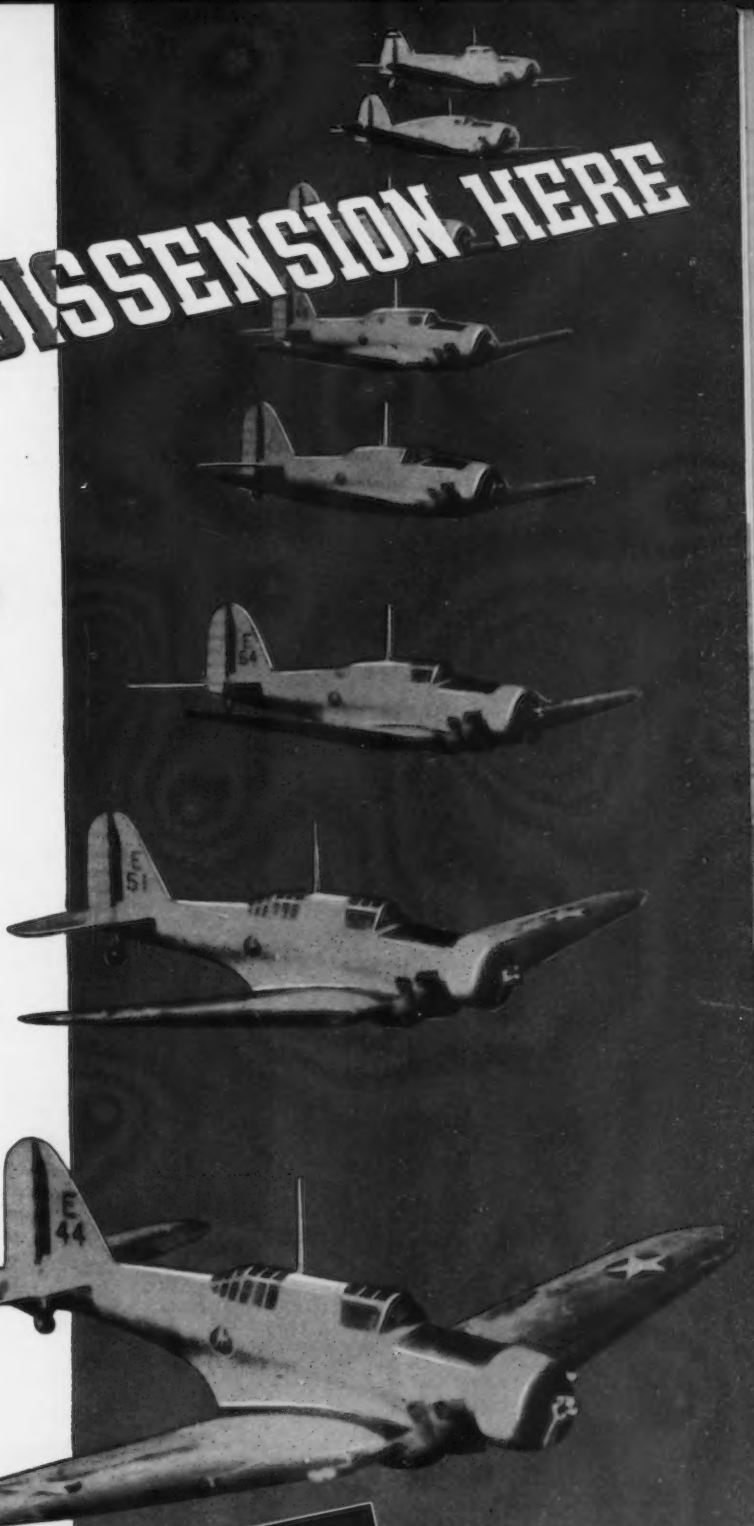
MACHINED AIRCRAFT PARTS FINISHED FROM  
OHIO SEAMLESS TUBING. (PHOTO COURTESY OF  
CLEVELAND GRAPHITE BRONZE CO.)



## THE OHIO SEAMLESS TUBE COMPANY



PHOTO COURTESY OF U. S. ARMY AIR CORPS





# PRICES

## BOILER TUBES

Seamless Steel and Lap Weld Commercial  
Boiler Tubes and Locomotive Tubes  
Minimum Wall

(Net base prices per 100 ft. f.o.b. Pitts-  
burgh, in carload lots)

	Seamless	Weld, Cold Drawn	Hot Rolled
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)	Base
40,000 lb. or ft. over	5%
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	10%
5,000 lb. or ft. to 9,999 lb. or ft.	10%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

## CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	\$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago. \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.

## WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District  
and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)  
Base Price—\$200 per Net Ton

### Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

### Wrought Iron (Butt Weld)

½ in.	25	3½
¾ in.	30	10
1 and 1½ in.	34	16
1½ in.	38	18½
2 in.	37½	18

### Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

### Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

### Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

### Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

### Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

### Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

## Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads) \$135.00

## Spiegeleisen

Per Gross Ton Furnace  
Domestic, 19 to 21% \$36.00  
Domestic, 26 to 28% 49.50

## Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)  
50% (carload lots, bulk) \$74.50  
50% (ton lots, packed) 87.00  
75% (carload lots, bulk) 135.00  
75% (ton lots, packed) 151.00

## Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)  
F.o.b. Jackson, Ohio \$29.50\*  
Buffalo 30.75\*  
For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorus or over.  
\*Official OPA price established June 24, 1941.

## Bessemer Ferrosilicon

Prices are \$1 a ton above Silvery Iron quotations of comparable analysis.

## Ferrochrome

(Per Lb., Contained Cr, Delivered Carload lots, Lump Size, on Contract)  
4 to 6 carbon 13.00c.  
2 carbon 19.50c.  
1 carbon 20.50c.  
0.10 carbon 22.50c.  
0.06 carbon 23.00c.

Spot prices are ¼ c. per lb. of contained chromium higher.

## Ferroalloys

### Silico-Manganese

(Per Gross Ton, Delivered, Carloads, Bulk)  
3 carbon \$120.00  
2.50 carbon 125.00  
2 carbon 130.00  
1 carbon 140.00

### Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload \$2.00  
Ferrotungsten, 100 lb. and less... 2.25  
Ferrovanadium, contract, per lb. contained V, del'd \$2.70 to \$2.90†  
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots \$2.25†  
Ferrocobaltititanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload contract, net ton \$142.50  
Ferrocobaltititanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload contract, net ton \$157.50  
Ferrophosphorus, electric or blast furnace materials, carloads, f.o.b. Anniston, Ala., for 18%, with \$3 untag freight, equalized with Rockdale, Tenn., gross ton \$58.50  
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 untag freight equalized with Nashville, gross ton \$75.00  
Ferromolybdenum, per lb., Mo, f.o.b. furnace 95c.  
Calcium molybdate, per lb. Mo, f.o.b. furnace 80c.  
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.  
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa. 80c.

\*Spot prices are \$5 per ton higher.  
†Spot prices are 10c. per lb. of contained element higher.

## LAKE SUPERIOR ORES

(51.50% Fe., Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer, 51.50	\$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

## COKE\*

### Furnace

Per Net Ton  
†Connellsville, prompt \$6.00

### Foundry

†Connellsville, prompt \$6.75 to \$7.00  
By-product, Chicago \$12.25  
By-product, New England \$13.75  
By-product, Newark \$12.40 to \$12.95  
By-product, Philadelphia \$12.38  
By-product, Cleveland \$12.30  
By-product, Cincinnati \$11.75  
By-product, Birmingham \$8.50†  
By-product, St. Louis \$12.02  
By-product, Buffalo \$12.50

\*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, 1941, p. 94B. Maximum beehive furnace coke prices established by OPA, Jan. 26, †F.O.B. oven.  
Ceiling for operators of hand drawn ovens using trucked coal is \$6.50.

## FLUORSPAR

Per Net Ton  
Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail \$25.00  
Domestic, f.o.b. Ohio River landing barges 25.00  
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines 25.00

## REFRACTORIES

(F.o.b. Works)

### Fire Clay Brick

Per 1000  
Super-duty brick, St. Louis \$64.60  
First quality, Penna., Md., Ky., Mo. & Ill. 51.30  
First quality, New Jersey 56.00  
Second quality, Penna., Md., Ky., Mo. & Ill. 46.55  
Second quality, New Jersey 51.00  
No. 1, Ohio 42.00  
Ground fire clay, net ton 7.60

### Silica Brick

Pennsylvania & Birmingham \$51.30  
Chicago District 58.90  
Silica cement, net ton (Eastern) 9.00

### Chrome Brick

Per Net Ton  
Standard or chemically bonded, Balt., Plymouth Meeting and Chester \$54.00

### Magnesite Brick

Standard, Balt. and Chester \$76.00  
Chemically bonded, Baltimore 65.00

### Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks (carloads) \$44.00  
Domestic, f.o.b. Chewelah, Wash. (in bulk) 22.00